

# **ATTACHMENT C**

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF CALIFORNIA  
OAKLAND DIVISION

Cameron et al. v. Apple Inc.

Case No. 4:19-cv-03074-YGR

## Expert Class Certification Report of

# Professor Einer Elhauge

Einen Elch

June 1, 2021

**HIGHLY CONFIDENTIAL: SUBJECT TO PROTECTIVE ORDER**

## HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

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ASSIGNMENT

1. “Plaintiffs [iOS developer class] sell their iOS apps or app-related digital products via Apple’s App Store.”<sup>1</sup> Plaintiffs allege that “Apple has never permitted anyone else to distribute apps and related digital products to the many millions of U.S. owners of its mobile devices”<sup>2</sup> and that this allows Apple “to charge developers a supracompetitive 30% commission on the sale of paid apps and in-app products.”<sup>3</sup> I understand that Plaintiffs have moved to certify a class defined as: “All U.S. developers of any Apple iOS application or in-app product (including subscriptions) sold for a non-zero price via Apple’s iOS App Store at any time on or after June 4, 2015” (hereinafter “Class” or “Developer Class”).<sup>4</sup>

2. Plaintiff counsel has asked me to perform an economic analysis of the evidence in this case to answer the following questions about the challenged conduct:

- A. Can common economic evidence establish the existence of a relevant antitrust market or markets for iOS app and digital in-app-purchase (IAP) distribution services?
- B. Can common economic evidence establish whether Apple has monopoly power or market power in any relevant markets?
- C. Can common economic evidence establish whether Apple’s challenged conduct reduced competition and thereby caused the developer class to pay supracompetitive commissions?
- D. Can common economic evidence establish whether Apple’s challenged conduct has any procompetitive benefits, and whether any such benefits outweigh any reduction in competition?

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<sup>1</sup> Plaintiffs’ Consolidated Class Action Complaint, Document 53 at ¶2 (Case 4:19-cv-03074-YGR, N.D. Cal., 09/30/19) (hereinafter “Developer Class Complaint”).

<sup>2</sup> Developer Class Complaint at ¶2.

<sup>3</sup> Developer Class Complaint at ¶3.

<sup>4</sup> There are 59,420 class members who appear in Apple’s produced transaction data, which currently stops in September 2019. *See infra* Part V.A.



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**EXECUTIVE SUMMARY***I. The Relevant Market Is the U.S. Market for iOS App and Digital In-App-Purchase Distribution Services*

3. I demonstrate that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services. The distribution of iOS apps includes all the ways that developers can distribute native apps to users of iOS devices in the United States. Digital IAP distribution services include mechanisms used to make in-app purchases of *digital* products, such as app upgrades, but does not include mechanisms for the in-app purchase of physical goods and services, such as buying physical goods through the Amazon app or rides through the Uber app. For brevity, I will sometimes refer to iOS app and digital IAP distribution services as simply “iOS app distribution” and firms in this market as “iOS app distributors,” but when I do so I mean that term to encompass digital IAP mechanisms as well. None of my conclusions depend on whether the market for iOS app and digital IAP distribution services can be divided into separate markets for iOS app distribution and digital IAP mechanisms. Key aspects of both iOS app and digital IAP distribution services are transactional in nature, and thus I find that the market encompasses both the developer side and the user side, which is in accord with the opinions of the experts for both Apple and Epic in their antitrust litigation. The relevant geographic market for this case is the United States.

4. This market definition is supported by the following evidence:
  - A. The Merger Guidelines describe the standard methodology for defining the relevant product market, which is to first rank substitutes for the defendant’s product at issue from closest to most distant, and then identify the smallest set of closest substitutes that satisfies the Hypothetical Monopolist test.
  - B. The closest substitutes to Apple’s App Store in the absence of the challenged conduct would be rival iOS app distributors and direct distribution of native iOS apps. Products that distribute apps for other operating systems, such as the Google Play Store and Steam, are more distant partial substitutes.
  - C. The Hypothetical Monopolist test shows that the iOS app distribution market (i.e., a market limited to iOS app distributors and direct distribution of native iOS apps) is sufficiently broad. Multiple types of evidence support this conclusion, including:
    - a) Apple’s commissions in the actual world, where it is a near-100% monopolist in iOS app distribution, have been far more than 5%

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higher than the prices that (i) have prevailed in more competitive app distribution markets or (ii) would have prevailed in the iOS app distribution market without Apple’s anticompetitive conduct, according to the estimates of other experts.

- b) Apple’s extraordinarily high profit margins provide direct evidence that, as a near-100% monopolist, Apple has exercised a power to raise prices far more than 5% above competitive levels.
- c) Qualitative evidence also indicates that potential alternatives for app distribution would not constrain a 100% monopolist from profitably raising prices for iOS app distribution significantly above competitive levels. This qualitative evidence includes (for example) the following facts: (i) Less than 2% of those who own iOS smartphones also own an Android smartphone, and thus the other 98% could not possibly switch to using an Android app distributor (like the Google Play Store) to obtain an app that they could use on a smartphone; (2) only 14-20% of iOS device owners own a Sony PlayStation and only some iOS apps are even available in a non-iOS version compatible with the Sony PlayStation, so the odds are small that, for any given iOS app, an iOS device owner could switch to getting and using a non-iOS version of that app on a PlayStation, and even then they could not use the app with the same convenience as having it on a mobile device; and (3) only 1% of the top iOS apps (weighted by revenue) are also available in a non-iOS version on the leading Windows app distributor, Steam, and a large share of iOS device owners do not own a Windows computer, so few could switch to getting and using a non-iOS version of that app on a Windows computer, even if they were willing to sacrifice the convenience of using the app on a mobile device.

5. Apple’s experts in the related *Epic* litigation have defined the relevant market differently, but their market definition is incorrect in at least two respects.

- A. Apple’s experts incorrectly defined separate markets for the distribution of games versus non-games. This is incorrect because the evidence shows that the relevant product (iOS app distribution) is the same for both games and non-games and that any anticompetitive effects and elevated prices in that product market apply equally to both games and non-games.
- B. Apple’s experts made the fundamental mistake of including (just about) every *potential* substitute for the App Store in the relevant market, rather than only the smallest set of closest substitutes that passes the Hypothetical Monopolist test. This fundamental mistake led them to incorrectly

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conclude that the relevant market includes distant substitutes that cannot even distribute native iOS apps, such as the Google Play Store, Steam, and the PlayStation store, and to which iOS users could rarely switch to get and use a non-iOS version of an iOS app for reasons summarized above.

6. However one resolves these market definition issues, they are all common to the class because the correct definition of the relevant market is the same for all class members. Further, the methodology, evidence, and analysis used to define the relevant market would be the same even if every class member brought a separate antitrust suit.

*II. Apple Has High Market Shares and Market Power in All Potentially Relevant Markets in This Case*

7. I evaluate Apple’s market shares and market power in a number of potentially relevant markets, and I reach the following conclusions:

- A. Apple has had a near-100% market share in the U.S. market for iOS app and digital IAP distribution services, which is the relevant market for assessing effects from the alleged anticompetitive conduct in this case. This near-100% market share reflects the fact that Apple’s exclusivity restraints foreclose 100% of this market, with the result that the only rivals have been fringe distributors who were willing and able to both violate Apple’s contractual conditions and circumvent Apple’s technological restraints.
- B. Apple has had dominant and increasing market shares in the U.S. smartphone and tablet markets, ranging from 57-66% for smartphones and 55-63% for tablets, even with conservatively broad definitions of those device markets.
- C. Even if one (conservatively but incorrectly) broadened the definition of the app distribution market to include all app and digital IAP distribution services on mobile devices, thus including app distribution on Android devices, Apple would still have had a dominant market share ranging from 60-64%.
- D. Apple has possessed monopoly power (and thus necessarily market power) in the U.S. market for iOS app and digital IAP distribution services throughout the Class Period. Further, even if one (conservatively but incorrectly) broadened the market to include all app and digital IAP distribution services on mobile devices, Apple would still have had monopoly power and market power. Three independently sufficient bases confirm Apple’s monopoly and market power in these markets:

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- a. a high market share (nearly 100% or, even if the market is incorrectly broadened, 60-64%), coupled with high barriers to entry and expansion;
  - b. direct evidence that Apple has the power to charge supracompetitive prices for iOS app distribution, including extraordinarily high profit margins that greatly exceeded not only the levels that the literature indicates could be considered reasonably competitive, but also Google’s profit margin for Android app distribution (despite Google’s own market power and less extreme anticompetitive foreclosure of the latter); and
  - c. direct evidence that Apple has exercised a power to exclude rivals from this market, as detailed in the analysis showing it foreclosed 100% of iOS app distribution, which also foreclosed 60-64% of even an incorrectly broadened market for all app distribution given Apple’s share of such a broadened market.
- E. Competition in the smartphone and tablet markets has not significantly constrained Apple’s monopoly power (and market power) in the U.S. market for iOS app and digital IAP distribution services. Apple’s expert in the *Epic* litigation acknowledges that significant competition in a foremarket market will constrain a firm’s market power in an aftermarket only if three conditions are all met: (1) robust foremarket competition; (2) consumer ability to estimate lifecycle costs of aftermarket purchases; and (3) no lock in of consumers in the foremarket. None of those three necessary conditions are met here because:
  - a. The foremarkets for smartphones and tablets have not been robustly competitive because Apple has had dominant market shares and monopoly (and market) power in those foremarkets. Apple’s monopoly (and market) power in those foremarkets is confirmed by: (i) high market shares and high barriers to entry and expansion; (ii) direct evidence of a power to price far higher than other mobile device makers; and (iii) direct evidence of a power to exclude, as evidenced by Apple’s use of a requirements tie of iOS devices to iOS app distribution to help impose exclusivity restraints on the latter.
  - b. Customers cannot gather sufficient information to estimate, before making a mobile device purchase, the expected lifecycle costs of buying apps on that device, given that: (i) a significant amount of app spending occurs on apps that did not even exist at the time the device was purchased; and (ii) app purchases are unpredictable and vary greatly across consumers.

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- c. Consumers are locked into the foremarket by high switching costs. Consumers hold smartphones on average for 2.6 years and thus cannot in the interim switch devices in response to variations in app distribution competition without incurring the cost of unnecessarily buying a new smartphone. Even when consumers are buying a new mobile device, the average cost of switching from a device with iOS to one with the Android OS is estimated to be \$138-155. In contrast, 75% of iOS device owners spent \$18.58 or less on iOS apps per the average device lifespan, which given Apple’s average 28.4% commission meant only \$5.28 in commissions paid per average device lifespan. A five percent increase in commissions would thus (even if we unrealistically assumed they would be 100% passed through to consumers) raise prices by at most 26 cents for 75 percent of consumers. Twenty-six cents is vastly less than the \$138-155 cost needed to overcome the costs of switching from an iOS device to an Android device, and thus competition in the foremarket could not possibly constrain aftermarket prices to competitive levels. Consistent with these high switching costs, surveys show that 85-91% of consumers do not change operating systems when they purchase a new mobile device.

8. However one resolves these issues on market share and market power, they are all common to the class because the correct calculation of each market share, as well as the correct conclusion on the existence of market power in each market, would be the same for all class members. Further, the methodology, evidence, and analysis used to calculate market shares and assess market power would be the same even if every class member brought a separate antitrust suit.

### *III. Apple Foreclosed 100% of the iOS App Distribution Market*

9. Apple has foreclosed 100% of the iOS app distribution market by using a combination of contractual and technological exclusivity restraints that allow developers to sell native iOS apps to third parties only through Apple’s own iOS app stores (the App Store, Apple Business Manager, and Apple School Manager). Forcing consumers and developers to use the Apple’s iOS app stores for the sale of native iOS apps has also forced users and developers to use Apple’s IAP mechanism for digital IAPs in order to satisfy Apple’s app review and be approved for distribution via Apple’s iOS app stores. Even if one incorrectly defined a broader market for app distribution on any mobile device, Apple’s exclusivity restraints

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foreclosed 60-64% of that broader market, given that its market share in that broader market is 60-64% and it forecloses all the app distribution that it provides.

10. Apple does not appear to dispute the general point that it restrains developers from distributing native iOS apps to third parties outside of Apple’s iOS app stores. Nor does Apple dispute that it extends this exclusivity restraint to digital IAP transactions after the initial distribution because apps distributed through Apple’s iOS app stores must use Apple’s APIs for in-app purchases of digital products. Rather than disputing the existence of this exclusivity restraint, Apple argues that this exclusivity restraint is procompetitive.

11. There are a total of eight ways a developer can install an iOS app, including not only through the App Store, but also via customized Apple app stores limited to users at particular businesses or schools (Apple Business/School Manager), via methods that do not allow app sales (TestFlight, Ad Hoc distribution, Enterprise Distribution, and Free Xcode provisioning), and via unauthorized app stores on jailbroken iOS devices (which would require both users and developers to violate their agreements with Apple). The result is that Apple’s restraints foreclose 100% of the iOS app distribution market, even though firms violating some of those restraints have been able to engage in some minor distribution of iOS apps. None of these alternative installation methods constrained Apple’s ability to charge supracompetitive commissions for iOS app distribution.

12. Apple has also increased its ability to impose these exclusivity restraints by tying them (for device purchasers) to the purchase of iOS devices and (for developers) to the right to run their apps on iOS devices. This tie is anticompetitive for the following reasons:

- A. The tying condition it imposes is a requirements tie, which is the most restraining type of tie because it ties the tying product to exclusivity on the tied product.
- B. Apple’s iOS devices are separate products from iOS app distribution given that unbundling devices and operating systems (OSs) from the distribution of apps on those devices and OSs is not only feasible and desired, but common in other markets. In the Android device market, the largest maker of Android mobile devices, Samsung, does not tie device sales to exclusive app distribution. Nor does Google tie exclusive app distribution to either the mobile devices it sells or the Android OS it runs. Microsoft does not tie its Windows OS to exclusive app distribution. And even Apple itself does not require purchasers of macOS devices, or developers of apps that run on them, to use its macOS app distribution platform.



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- C. For reasons summarized above, Apple’s iOS devices has had tying market power in the smartphone and tablet markets.
- D. For reasons summarized above, the tied foreclosure share for this tie is 100% of the iOS app distribution market and would be 60-64% of even an incorrectly defined broader market for app distribution on any mobile device.
- E. For reasons summarized below, this tie to an exclusivity restraint has no procompetitive justification.

13. Whether or not one agrees with my conclusions on the above issues, they involve issues that are common to the class because they involve evidence and restraints that applied to all class members. None of the evidence is specific to any individual class member, and separate individual actions would have to duplicate the same factual inquiry.

*IV. Restricting Competition from Rival iOS App Distributors Anticompetitively Inflated Apple’s Average Profit-Maximizing Commission*

14. By completely prohibiting *all* competition in the iOS app distribution market, Apple has caused the maximum possible amount of anticompetitive harm in this market, thereby anticompetitively inflating Apple’s profit-maximizing average commission for its iOS App Store. Specifically:

- A. Apple would have faced significantly more competition from rival iOS app distributors and direct distribution of iOS apps but for its challenged conduct, given that:
  - a. Absent Apple’s exclusivity restraints, entry barriers would have been low, as Apple’s experts agree.
  - b. High profit margins would have incentivized entry.
  - c. Many firms would have been well-positioned to enter but for Apple’s exclusivity restraints.
  - d. In app distribution markets without similar exclusionary conduct, there are typically several significant competing app distributors and a significant amount of self-distribution.
- B. The additional competition in the but-for world would have reduced Apple’s profit-maximizing commission. Entry would fail to reduce commissions only if, in the but-for world, iOS app distributors would have perfectly price coordinated after entry. Such perfect price coordination would be implausible given market characteristics such as product differentiation, low price transparency, and the significant number of competitors expected in the but-for world. Moreover, in similar app

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distribution markets for other OSs untainted by similar exclusionary conduct, such as app distribution of Windows or macOS apps, firms do not perfectly price coordinate.

- C. My conclusion that Apple’s average commission would have been lower in the but-for world is consistent with Prof. Economides’ and Prof. Evans’ estimates of the average commission that would have prevailed in the iOS app distribution market but for Apple’s anticompetitive conduct.

15. All the evidence, methodologies, and conclusions regarding whether Apple’s exclusivity restraints inflated its commissions are common to the developer class. None of the evidence I rely upon for this analysis is specific to any individual developer. Further, all the methodologies that I use and conclusions that I reach regarding the effect on commissions pertain to the effect of competition on the App Store’s *average* profit-maximizing commission, and thus are inherently common to the developer class. In the next section, I further show that anticompetitively inflating the average App Store profit-maximizing commission harmed 100% of class members.

*V. All Class Members Paid an Anticompetitively Inflated Commission*

16. Evidence common to the class indicates that all class members paid an anticompetitively inflated commissions to Apple during the class period. I establish that:

- A. There are approximately 60,000 class members.
- B. In the but-for world, Apple would face more intense competition for *all* developers, so one would accordingly expect Apple to respond by reducing commissions for *all* developers.
- C. In the but-for world, Apple would most likely adjust its entire commission structure downward, which would necessarily reduce all class members’ commissions. This conclusion reflects the facts that:
  - a. Apple has always refused to negotiate commissions with individual developers.
  - b. Apple has always maintained a rigid commission structure with only two tiers.
  - c. Apple would have economic reasons to reduce both commission tiers in order to respond to competition for all developers while simultaneously maintaining a commission differential that incentivizes developers in certain ways that Apple finds beneficial.
- D. Apple’s commission was anticompetitively inflated for both games and non-games.



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*VI. The Absence of Procompetitive Effects*

17. Excluding all rival iOS app distributors has significant anticompetitive effects. Thus, absent procompetitive effects that are large enough to offset these anticompetitive effects, Apple’s challenged conduct must on balance be anticompetitive and inefficient as a matter of antitrust economics. Although exclusive dealing agreements and requirements ties can have procompetitive effects in some cases, I have not found evidence that Apple’s use of those strategies had procompetitive effects in this case.

18. Apple argues that its exclusivity restraints on app distribution have had the procompetitive effect of advancing consumer welfare by preventing consumers from using rival iOS app distributors who might allow them to install malicious or otherwise undesirable apps. But Apple’s exclusivity restraints have not had this procompetitive effect for the following reasons.

- A. Without Apple’s exclusivity restraints, consumers who found a consumer welfare benefit from exclusive app distribution by Apple could have simply chosen to buy apps only through the App Store, so the exclusivity restraint was not causally related to achieving any posited consumer welfare gain for them. Instead, the exclusivity restraint had a causal effect only when it prevented consumers from making a different choice when they found their welfare would be enhanced by getting iOS app distribution from another source, and in that case the causal effect was to *reduce* consumer welfare.
- B. Without Apple’s exclusivity restraints, Apple could still have maintained a “walled garden” by controlling which iOS apps are “secure” enough to run on iOS. Apple could simply have determined which apps were secure enough to run on iOS without linking that approval to exclusive distribution of those apps on Apple’s iOS app stores. Indeed, without exclusive app distribution, Apple already does control which macOS apps are “secure” enough to run on macOS and could use a similar method for iOS. Or Apple could have simply continued the same app review it has already used to approve iOS apps without linking approvals to any exclusivity on iOS app distribution.
- C. Without the exclusivity restraint that prevented competition in iOS app distribution, Apple would have actually had greater incentives to invest in sound app review to exclude apps that were not “secure.”

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19. Apple also argues that without exclusive distribution of iOS apps, Apple would not have had incentives to invest as much in its iOS operating system, its device hardware, developer support, or its App Store. I conclude that Apple would have had incentives to make similar investments without exclusive iOS app distribution. This conclusion is confirmed by the investments made by Apple and other firms in all those facets in other markets or situations when exclusive app distribution is absent.

20. All of the methodologies and evidence I use to assess procompetitive effects, and all the conclusions I reach about those procompetitive effects are common to the class. None of my analysis of procompetitive effects applies to some class members but not others.

*VII. Consumers Also Suffered Anticompetitive Harm*

21. Because the iOS app distribution market is a two-sided market, I have also analyzed the effect of Apple’s challenged conduct on consumers in the market (i.e., people who purchase iOS apps or purchase digital products within iOS apps). I conclude that Apple’s anticompetitive conduct harmed consumers of iOS apps and in-app content. I explain that restricting consumers’ choice of iOS app distributor directly reduces consumer welfare, even if one conservatively assumes that the number and quality of apps and IAPs would be exactly the same in the but-for world as they were in the actual world. I also explain that anticompetitively inflating the commission Apple charged developers also harmed consumers by reducing the quantity and quality of iOS apps and in-app content.

22. Because Apple’s challenged conduct has anticompetitively harmed both sides of the domestic iOS app distribution market (developers and consumers), it was necessarily anticompetitive on net when one considers both sides of the market.

23. The conclusion about whether Apple’s challenged conduct on was anticompetitive, after accounting the effects on both sides of the market, is necessarily common to the Developer Class. The conclusion is, by definition, the same for each and every developer (and each and every consumer) regardless of whether only some developers or some consumers were harmed. Put another way, the conclusion about the combined effect of the challenged conduct on both sides of the market does not depend on whether each individual Developer had an injured-user customer, but instead on the sum of the effects of the conduct across all developers and all consumers.

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### QUALIFICATIONS

24. I am the Petrie Professor of Law at Harvard University, where I teach and write about the economic analysis of antitrust law, health policy, and various other subjects. I am the author of various books, including *U.S. Antitrust Law & Economics*; co-author of *Global Antitrust Law & Economics*, *Global Competition Law & Economics*, and *Areeda, Elhauge & Hovenkamp, Vol X, Antitrust Law*; and editor of *The Research Handbook On the Economics of Antitrust Law* and *The Fragmentation Of U.S. Health Care*. I am also the author of numerous articles on various topics involving the economic analysis of antitrust and other legal issues, including articles on monopolization and exclusionary agreements. My CV (attached as Exhibit A) lists all my publications, including all those in the past ten years. Exhibit B to this report describes my compensation and the cases in which I have testified as an expert in a trial or deposition in the past four years. I am being compensated at a rate of \$1250 per hour for my work on this case, and my consulting firm, Legal Economics LLC, is being compensated \$235-645 per hour for the work of my staff on this report. None of my compensation in this case is contingent upon the outcome of the case or any aspect of the case.

25. I am also President of Legal Economics, LLC, which provides expert witnesses and support work on legal cases. I myself have testified as an expert witness on antitrust economics in dozens of federal cases, and I have been qualified as an expert in antitrust economics by all twenty courts to rule on that question. I have also served as an expert witness on antitrust economics before Congress, arbitration panels, and competition agencies in the US, EC, Korea, and Brazil. My testimony as an economics expert has spanned a wide range of topics, including reverse-payment settlements, other horizontal agreements, vertical agreements, mergers, monopolization and exclusionary conduct, price discrimination, health economics, patent economics, and contract economics. My clients have included leading corporations, law firms, and the United States government. I have been named one of the world’s leading competition economists in the *International Who’s Who of Competition Lawyers and Economists*.

26. I am a Member of Advisory Boards for the Journal of Competition Law & Economics, the Social Sciences Research Network on Antitrust Law & Policy, and the Social Sciences Research Network on Telecommunications & Regulated Industries. I have taken courses in economics, statistics, antitrust, and economic analysis of law, and I regularly read and use economic literature on antitrust economics, including books on industrial organization. I also regularly attend workshops on those and other topics regarding the economic analysis of law. I

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routinely use and teach economic analysis in my classes, including those that I regularly offer on antitrust law and economics.

**I. THE RELEVANT MARKET IS THE DOMESTIC MARKET FOR iOS APP AND DIGITAL IN-APP-PURCHASE (IAP) DISTRIBUTION SERVICES**

27. When analyzing whether alleged conduct has anticompetitively harmed consumers, economists regularly define a “relevant market” to determine the products and participants relevant to assessing those allegations of harm.<sup>5</sup>

28. I conclude that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services. The distribution of iOS apps includes all the ways that developers can distribute native apps<sup>6</sup> to users of iOS<sup>7</sup> devices in the United States.<sup>8</sup> Apple itself describes “app distribution” as the function of its App Store in its Developer Program License Agreement.<sup>9</sup> Digital IAP

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<sup>5</sup> See ABA Section of Antitrust Law, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.A. (2012) (“The purpose of market definition is to provide a context within which competitive effects can be analyzed”).

<sup>6</sup> Unless otherwise stated, any time this report discusses “apps”, “mobile apps”, or “applications”, I am referring to native apps, and not web apps. Native apps are developed for a specific mobile operating system, whereas web apps “are hosted on the web and accessed from a browser on the mobile device.” Néstor Duch-Brown, *The Competitive Landscape of Online Platforms*, European Commission, Joint Research Centre Digital Economy Working Paper, 14 n.27 (2017).

<sup>7</sup> For brevity, here I consider the term “iOS” to encompass both “iOS” and “iPadOS.” iPadOS is based on iOS, and Apple called the operating systems for the iPhone and iPad both “iOS” until 2019. See Henry Casey, Apple Official Renames iOS on iPad: Meet iPadOS (published June 2019, available at <https://www.tomsguide.com/us/ipad-os-ios-13,news-30230.html>). Apple’s experts likewise use the term “iOS” to include “iPadOS.” Rubinfeld 2021-02-16 report in *Epic v. Apple* ¶18 (“For the purposes of my analysis, there is no substantive difference between the iOS operating system on the iPhone and the iPadOS operating system on the iPad”).

<sup>8</sup> As detailed in Part III, there are several methods that developers can use to install iOS apps for limited purposes such as testing and development (including TestFlight, Ad Hoc distribution, Enterprise Distribution, and Free Xcode provisioning), but Apple does not permit them to be used to sell iOS apps or for wide-spread distribution to third parties.

<sup>9</sup> See, e.g. Apple DPLA §6.1 (“You may submit Your Application for consideration by Apple for *distribution* via the App Store...”); *id.* (“new releases and new versions of Your Application must be submitted to Apple for review in order for them to be considered for *distribution* via the App Store”); *id.* 6.8 (“Selection by Apple for *Distribution*. You understand and

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distribution services include mechanisms used to make in-app purchases of *digital* products, such as app upgrades, but does not include mechanisms for the in-app purchase of goods and services, such as buying goods through the Amazon app or rides through the Uber app. Apple bundles iOS app distribution to digital IAP distribution by requiring that any app distributed through Apple’s iOS app stores must use Apple’s mechanism for in-app purchases of digital products.<sup>10</sup> In contrast, Apple does not bundle iOS app distribution to IAPs of *non-digital* products, and in fact Apple prohibits using Apple’s IAP mechanism for the latter.<sup>11</sup> Key aspects of the iOS app and digital IAP distribution services are transactional in nature, and thus I find that the market encompasses both the developer side and the user side, which is in accord with Apple’s own experts in *Epic v. Apple*.<sup>12</sup> For brevity, I will sometimes refer to iOS app and digital IAP distribution services as simply “iOS app distribution” and firms in this market as “iOS app distributors,” but when I do so I mean that term to encompass digital IAP mechanisms as well.

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agree that if You submit Your Application to Apple for *distribution* via the App Store...” (emphasis added in all citations).

<sup>10</sup> Apple, *App Store Review Guidelines* (available at <https://developer.apple.com/app-store/review/guidelines/>) § 3.1.1 (“If you want to unlock features or functionality within your app, (by way of example: subscriptions, in-game currencies, game levels, access to premium content, or unlocking a full version), you must use in-app purchase. Apps may not use their own mechanisms to unlock content or functionality, such as license keys, augmented reality markers, QR codes, etc. Apps and their metadata may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than in-app purchase.”); *see infra* Part III (providing more detail about this bundle and explaining why this applies to apps distributed not only through Apple’s App Store but also through its Business Manager and School Manager). Apple’s experts in the *Epic* litigation have acknowledged that Apple bundles iOS app distribution to its IAP mechanism. *See* Schmalensee 2021-03-15 report in *Epic v. Apple* ¶233-34.

<sup>11</sup> Apple, *App Store Review Guidelines* (available at <https://developer.apple.com/app-store/review/guidelines/>) §3.1.3(e) (“Good and Services Outside of the App: If your app enables people to purchase physical goods or services that will be consumed outside of the app, you must use purchase methods other than in-app purchase to collect those payments. s One-to-few and one-to-many realtime services must use in-app purchase.”).

<sup>12</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶88 (“[b]ecause the App Store exists to facilitate transactions between developers and end users using the iOS platform, the App Store supplies one basic product—transactions.... Because the basic underlying product here is transactions, identifying the boundaries of the relevant antitrust product market should therefore encompass both sides of the platform.”). Prof. Schmalensee also makes a number of claims regarding U.S. law on transaction platforms, on which I offer no opinion.



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29. In *Epic v. Apple*, Apple’s experts took the position that the relevant geographic market is the United States for the distribution of gaming apps.<sup>13</sup> There is no economic basis for concluding that the geographic market would be any different for the distribution of all iOS apps. For example, Apple expert Prof. Lafontaine defines the gaming app distribution market as the United States “because platform offerings and access to services differ depending on the consumer’s country of residence, thereby restricting the ability and willingness of consumers in the US to access game transactions on foreign transaction platforms”, but the evidence he cites to support this proposition for the Apple App Store is not specific to game transactions, but rather applies to the App Store generally.<sup>14</sup> For the purpose of this class report, I adopt Apple’s experts’ position that the relevant geographic market is the United States for all iOS app and digital IAP distribution services.

30. The following sections support my product market definition. These sections explain that:

- A. The Merger Guidelines describe the standard methodology for defining the relevant product market, which is to first rank substitutes for the defendant’s product at issue from closest to most distant, and then identify the smallest set of closest substitutes that satisfies the Hypothetical Monopolist test.
- B. The closest substitutes to Apple’s App Store in the absence of the challenged conduct would be rival iOS app distributors and direct distribution of native iOS apps. Products that distribute apps for other operating systems, such as the Google Play Store and Steam, are more distant partial substitutes.
- C. The Hypothetical Monopolist test shows that the iOS app distribution market (i.e., a market limited to iOS app distributors and direct distribution of native iOS apps) is sufficiently broad. Multiple types of evidence support this conclusion, including the following:
  - a) Apple’s commissions in the actual world, where it is essentially a 100% monopolist in iOS app distribution, are far more than 5% higher than the prices that (i) prevail in more competitive app distribution markets or (ii) would have prevailed in the iOS app distribution market without Apple’s anticompetitive conduct, according to the estimates of other experts.
  - b) Apple’s extraordinarily high profit margins provide direct evidence that, as a near-100% monopolist, Apple is already exercising a power to raise prices far more than 5% above competitive levels.

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<sup>13</sup> See, e.g., Lafontaine 2021-03-15 report in *Epic v. Apple* ¶21 (“The relevant antitrust geographic market is the United States.”).

<sup>14</sup> See Lafontaine 2021-02-16 report in *Epic v. Apple* ¶¶97-98.

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- c) Qualitative evidence also indicates that potential alternatives for app distribution would not constrain a 100% monopolist from profitably raising prices for iOS app distribution significantly above competitive levels. This qualitative evidence includes (among many other things) evidence about: (a) the low percentage of people who own an iOS smartphone and also own an Android smartphone that they could use to run Android apps; (b) the low percentage of iOS device owners who own a Sony PlayStation and the fact that only some iOS apps are even available in a non-iOS version compatible with the Sony PlayStation; and (c) the large share of iOS device owners who do not own a Windows computer and the low percentage of iOS apps that are also available in a non-iOS version on the leading Windows app distributor, Steam.
- D. None of my conclusions depend on whether the market for iOS app and digital IAP distribution services can be divided into separate markets for iOS app distribution and digital IAP mechanisms.
- E. Apple’s experts in the related *Epic* litigation have defined the relevant market differently, but their market definition is incorrect in at least two respects.
  - a) Apple’s experts incorrectly defined separate markets for the distribution of games versus non-games. This is incorrect because the evidence shows that the relevant product (iOS app distribution) is the same for both games and non-games and that any anticompetitive effects and elevated prices in that product market apply equally to both games and non-games.
  - b) Apple’s experts made the fundamental mistake of including (just about) every *potential* substitute for the App Store in the relevant market, rather than only the smallest set of closest substitutes that passes the Hypothetical Monopolist test. This fundamental mistake led them to incorrectly conclude that the relevant market includes distant substitutes that cannot even distribute native iOS apps, such as the Google Play Store, Steam, and the PlayStation store, and to which iOS users could rarely switch to get and use a non-iOS version of an iOS app.

31. However one resolves the issues just summarized and further detailed in this Part, those issues are all common to the class because the correct definition of the relevant market is the same for all class members. Further, the methodology, evidence, and analysis used to define the relevant market would be the same even if every class member brought a separate antitrust suit.

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***A. Market Definition Methodology***

32. The standard approach to market definition used by antitrust economists is outlined in the Department of Justice’s Horizontal Merger Guidelines, based on ranking the closest substitutes and performing the hypothetical monopolist test.<sup>15</sup> Apple’s economic experts in the *Epic v. Apple* litigation have acknowledged that this is the standard methodology used to define relevant markets<sup>16</sup> and that the “principles underpinning market definition are the same in the context of single-sided businesses market and two-sided platforms”.<sup>17</sup>

33. In the Horizontal Merger Guidelines approach, one first ranks the products that are most similar to the defendant’s products at issue, from the closest demand substitutes to the most distant.<sup>18</sup> For example, in car markets, the closest demand substitute to one luxury sedan is another luxury sedan, the next closest substitute is probably a non-luxury sedan, and even more distant partial substitutes include motorcycles and bicycles. Next, one starts with the smallest possible market that is potentially useful for analysis and evaluates whether that posited market would likely pass the “Hypothetical Monopolist Test.” The Hypothetical Monopolist Test asks whether a hypothetical 100% monopolist in a posited market would likely find it profit maximizing to charge prices that were at least 5% higher

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<sup>15</sup> The DOJ/FTC Horizontal Merger guidelines describe this methodology, among other commonly used market definition methodologies in economic analysis of antitrust issues. Although the government enforcement agencies most often apply this methodology to merger analysis, it is also applicable to exclusionary conduct cases. See DOJ/FTC Horizontal Merger Guidelines n.5 (2010) (noting that market definition is similar for non-merger conduct, such as monopolization, except that one cannot assume that the prices that exist in the market are at competitive levels because the alleged anticompetitive conduct may have in fact already elevated them above competitive levels).

<sup>16</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶85 (“[Market definition] is generally a first step in the assessment of the extent to which firms have market power and whether the alleged conduct resulted in harm to buyers and/or sellers in the market”) (citing the Horizontal Merger Guidelines); *id.* n. 264 (relying Horizontal Merger Guidelines for how geographic markets are defined); *id.* ¶93 (acknowledging that “antitrust practitioners often rely on the hypothetical monopolist test” described in the Horizontal Merger Guidelines to “operationalize the delineation of the relevant product and geographic market”); Lafontaine 2021-02-16 report in *Epic v. Apple* ¶40, n. 56 (relying on the Horizontal Merger Guidelines for the proposition that ‘market definition is fundamentally an inquiry about demand substitution”).

<sup>17</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶87.

<sup>18</sup> DOJ/FTC Horizontal Merger Guidelines §4.1.1 (2010) (“When applying the hypothetical monopolist test to define a market around a product offered by one of the merging firms, if the market includes a second product, the Agencies will normally also include a third product if that third product is a closer substitute to the first product than is the second product.”).



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than the prices that would prevail if the market were competitive.<sup>19</sup> If a hypothetical monopolist would, then the test is passed, meaning that the posited market is sufficiently broad (i.e., includes a sufficient number of substitutes) to be useful in economic analysis. If the test is failed, that tells the economist that the posited market is too narrow (i.e., includes an insufficient number of substitutes) to be useful in economic analysis. The posited market should then be expanded to include the next closest substitute, and then the hypothetical monopolist test should be repeated to see whether the slightly broader market is sufficiently broad.

34. The Hypothetical Monopolist Test thus functionally provides a precise, objective, and quantitatively measurable definition of which potential substitutes are “reasonably interchangeable” with the defendant’s product at issue. Under the Hypothetical Monopolist Test, the potential substitutes that are “reasonably interchangeable substitutes” with the defendant’s product are the smallest set of closest substitutes for the defendant’s product for which it is true that the price a single firm selling the product and all those substitutes (a hypothetical 100% monopolist) would charge is at least 5% higher than the price that would prevail if they were competitively sold by multiple firms. This formal definition of reasonably interchangeable substitutes is precise, objective, and quantitatively measurable because it explicitly and quantitatively defines the threshold for when potential substitutes are too distant to be “reasonably interchangeable,” which is when competition from that potential substitutes would not constrain the defendant from elevating prices at least 5% above competitive levels. In contrast, without the Hypothetical Monopolist Test, the definition of which potential substitutes are “reasonably” interchangeable would be largely subjective because what is “reasonable” to one person may not be “reasonable” to another.

35. Markets defined using the hypothetical monopolist test usually “exclude some substitutes to which some customers might turn” in response to a price increase for the products in the relevant market.<sup>20</sup> Economists generally define

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<sup>19</sup> See DOJ/FTC Horizontal Merger Guidelines §4 (2010) (describing the hypothetical monopolist test).

<sup>20</sup> DOJ/FTC Horizontal Merger Guidelines §4 (2010) (“Market shares of different products in narrowly defined markets are more likely to capture the relative competitive significance of these products, and often more accurately reflect competition between close substitutes. As a result, properly defined antitrust markets often exclude some substitutes to which some customers might turn in the face of the price increase even if such substitutes provide alternatives for those customers.”); *id.* §4.1.1 (“Groups of products may satisfy the hypothetical monopolist test without including the full range of substitutes from which customers choose.”). Relatedly, official

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markets narrowly to focus only on close substitutes because “defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares” that overstate the importance of distant substitutes.<sup>21</sup> Thus, under this test, the mere fact that some customers substitute between Products A and B does not necessarily mean that Products A and B are in the same market. Indeed, “The hypothetical monopolist test may identify a group of products as a relevant market even if customers would substitute significantly to products outside that group.”<sup>22</sup>

36. Here, the relevant starting point for the Hypothetical Monopolist test is asking whether the profit-maximizing commission a hypothetical 100% monopolist in the iOS app distribution market would charge would be at least 5% higher than the price that would prevail if there were instead unrestrained competition between multiple rival iOS app distributors. To be clear, this is 5 *percent*, not 5 percentage *points*, which is important to note when the price is itself expressed as a percentage commission. For example, a 5 percent increase on a 10 percent commission would be an increase from 10 percent to 10.5 percent (i.e., 10 percent \* 1.05), and not an increase from 10 percent to 15 percent.

### ***B. Ranking Closest Substitutes to Apple’s App Store***

37. As described above, the first step in the Merger Guidelines’ market definition methodology is to rank the demand substitutes for the defendant’s product at issue, from closest to most distant. The following sections explain that:

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commentary to the Merger Guidelines explains that: “Even when no readily apparent gap exists in the chain of substitutes, drawing a market boundary within the chain may be entirely appropriate when a hypothetical monopolist over just a segment of the chain of substitutes would raise prices significantly.” DOJ/FTC, Commentary on the Horizontal Merger Guidelines 15 (2006). The Merger Guidelines likewise explain that “relevant markets need not have precise metes and bounds.” DOJ/FTC Horizontal Merger Guidelines §4 (2010).

<sup>21</sup> DOJ/FTC Horizontal Merger Guidelines §4 (2010) (“Defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares. This is because the competitive significance of distant substitutes is unlikely to be commensurate with their shares in a broad market. Although excluding more distant substitutes from the market inevitably understates their competitive significance to some degree, doing so often provides a more accurate indicator of the competitive effects of the merger than would the alternative of including them and overstating their competitive significance”).

<sup>22</sup> DOJ/FTC Horizontal Merger Guidelines §4.1.1 (2010); American Bar Association, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.B.2.b.(1). (2012) (“The hypothetical monopolist test may be satisfied by a group of products even though it does not include the full range of substitutes available to buyers.”).

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1. Apple’s products at issue are its iOS app stores, principally the iOS App Store, which provides the distribution of native iOS apps to consumers (including digital IAPs).
2. App distributors are two-sided transaction platforms with strong indirect network effects, so one should consider both developer substitution and consumer substitution when ranking substitutes for Apple’s iOS app stores.
3. One determines how “close” a potential substitute is to Apple’s iOS app stores by assessing how likely it is that both developer and consumer demand for an iOS app transaction would shift from Apple’s iOS app stores to the potential substitute in response to price changes.
4. The closest substitutes for Apple’s iOS app stores are by definition other iOS app distributors.
5. The next closest substitute for Apple’s iOS app stores is direct distribution of native iOS apps.
6. All products that do not provide installation of native iOS apps are necessarily more distant, partial substitutes.

*1. The Apple Product at Issue Is Its iOS App Stores, which Provide Distribution of Native iOS Apps*

38. Here, the defendant’s product at issue are its iOS app stores. This principally means Apple’s App Store, which accounts for virtually all of Apple’s iOS app distribution revenue, but Apple also does distribute iOS apps to a small extent through Apple Business Manager and Apple School Manager.<sup>23</sup> For simplicity, I will sometimes use the “App Store” to refer to the collection of Apple’s iOS app stores since virtually all of Apple’s iOS distribution is through the App Store. As Apple’s own contracts acknowledge, Apple’s App Store provides “distribution” of native iOS apps to iOS devices.<sup>24</sup> The App Store also handles all in-app purchases (IAPs) of digital products within iOS apps.<sup>25</sup> “App distributors” in

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<sup>23</sup> See *infra* Part III, Section B.2.

<sup>24</sup> See *supra* note 9.

<sup>25</sup> Many iOS apps allow users to purchase “in-app” content. These types of transactions are known as “in-app purchases” (“IAPs”) because the mobile device users choose to purchase the content from within the app: Apple’s developer website states that developers can “[o]ffer customers extra content and features using in-app purchases — including premium content, digital goods, and subscriptions — directly within your app.” In-App Purchase, *available at* <https://developer.apple.com/in-app-purchase/> (accessed 2/22/2021). Apple often uses the term “In-App Purchase” to refer to its own application programming interface (API) for in-app

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general are third-party<sup>26</sup> transaction platforms that handle the distribution of apps and IAPs from developers to consumers. The most successful app distribution platforms include Apple’s iOS App Store, Google’s Play Store (for the Android OS), and Steam (for Windows and macOS). All successful app distributors perform at least the following functions:

- (a) Provide a curated storefront of apps available to consumers
- (b) Securely transfer the app installation files to consumers
- (c) Provide a secure transaction mechanism when developers sell apps to consumer or make sales of digital products within apps.<sup>27</sup>

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purchases, which leads to some conflation of “in-app purchase” as a general concept (purchasing from within an app) and “in-app purchase” as the term for Apple’s specific API solution for implementing purchasing within an app. For example, Apple’s App Store Review Guidelines state that “If you want to unlock features or functionality within your app, (by way of example: subscriptions, in-game currencies, game levels, access to premium content, or unlocking a full version), you must use in-app purchase” as opposed to other situations where developers can “use purchase methods other than in-app purchase”. <https://developer.apple.com/app-store/review/guidelines/>. Digital in-app purchases are required to use Apple’s in-app purchasing API, which Apple describes as necessary to collect those commissions. Declaration of Philip W. Schiller in Support of Defendant Apple Inc.’s Opposition to Plaintiff’s Motion for A Preliminary Injunctions in *Epic v. Apple* at ¶ 40 (“To collect its contractually-agreed commission on sales of in-app digital content, Apple needs to know when such transactions take place. For this reason, Apple requires third-party developers to use IAP for eligible transactions, and prohibits them from circumventing IAP.”); *id.* at ¶ 9 (“Apple limits its commission to sales of digital goods and services (like game levels, premium app features, digital subscriptions, etc.)”); APL-EG\_01264317 at 346 (“The commission has always applied to only the sale of digital content alone on the App Store”).

<sup>26</sup> I do not use the term “app distributor” to refer to distributors who *exclusively* self-distribute without hosting other developers’ apps; I refer to that situation as “direct distribution”.

<sup>27</sup> This description of their functions accords with the way app stores are understood in the literature. Jansen & Bloemendal define an “app store” as “An online curated marketplace that allows developers to sell and *distribute* their products to actors within one or more multi-sided software platform ecosystems.” Jansen & Bloemendal, *Defining App Stores: The Role of Curated Marketplaces in Software Ecosystems*, ICSOB 2013: Software Business. From Physical Products to Software Services and Solutions, 195 (June 2013) (emphasis added); *id.* (“To be considered an app store a system should: (1) be available using the internet, (2) be curated by an organization, typically but not necessarily the platform owner, (3) allow for the selling and buying of software products, (4) take care of the financial transactions involved in selling the software products, (5) have two distinct user groups: developers and users, (6) be serving one or more software ecosystem, and (7) implement a platform that takes care of the distribution of the software products.”); *see also* Ghazawneh & Henfridsson, *A paradigmatic analysis of digital application marketplaces*, 30 J. OF INFORMATION TECHNOLOGY 198, 200 (2015) (“the digital application marketplace plays three main roles. First, it matches end users, who seek to enhance the functionality of their computing device, with application developers, who seek to reach out with their software design. This is done both by determining the application offering (e.g., providing a

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39. During the class period, none of the major app distributors have charged consumers a fee to participate in their platform.<sup>28</sup> Instead, all of the major app distributors have required developers to pay a commission when they: (a) sell an app through the distributor; or (b) sell a digital product within an app obtained from the distributor. These commissions are thus the price that developers pay to participate in the distributor’s platform. App distributor commissions range from 7.5%-30%.<sup>29</sup>

*2. App Distributors Are Two-Sided Transaction Platforms, So One Must Consider Demand Substitution from Both Sides (Developers and Consumers)*

40. App distributors are two-sided transaction platforms, because they meet the conditions that: (1) the platform sells two different products to two distinct groups of customers that need the platform to intermediate the interaction, (2) the platform exhibits “indirect network effects”, which means that the more participants there are on one side of the platform, the more valuable the platform is to participants on the other side of the platform, and (3) the platform involves observable and simultaneous transactions between both sides.<sup>30</sup>

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catalog that details the features and design of a specific application) and providing search capacity to the end user. In this regard, digital application marketplaces gives an opportunity to browse and search across, sometimes, thousands of applications. Second, the digital application marketplace facilitates transactions, in terms of application delivery, payment transfer, and trust-related features such as rating systems. In particular, it typically offers the opportunity to download applications for immediate use on a computing device that supports the digital platform in question. Lastly, the digital application marketplace offers an institutional infrastructure, including legal and regulatory aspects of exchange of applications.”) (internal cites omitted).

<sup>28</sup> See *infra* Part I, Section B.3.b.

<sup>29</sup> See *infra* Paragraph 384 in Part V.C.3.c.

<sup>30</sup> See Evans, *The Antitrust Economics of Multi-Sided Platform Markets*, 20 YALE JOURNAL ON REGULATION 325, 331-332 (2003) (listing the three necessary conditions for a two-sided market to arise as: “(1) there are two or more distinct groups of customers”; “(2) There are [positive] externalities associated with customers A and B becoming connected or coordinated in some way,” such as “indirect network effects,” which “occur when the value obtained by one kind of customer increases with measures of the other kind of customers”; and “(3) an intermediary is necessary to internalize the externalities created by one group for the other group”); Filistrucchi, Geradin, van Damme & Affeldt, *Market Definition in Two Sided Markets*, 10 J. COMPETITION LAW & ECON. 293, n. 8 (2014) (“Demand is characterized by a direct network effect when consumers’ willingness to pay for a product depends on the number of other consumers (or the quantity bought) of the same product; demand is characterized by an indirect network effect when consumers’ willingness to pay for a product depends on the number of consumers (or the quantity bought) of another product.”). “Two-sided transaction markets, such as payment cards, are... characterized



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41. Here, the two “sides”<sup>31</sup> of each app distribution platform are: (1) device users (consumers); and (2) developers of native apps. An app distributor is more valuable to consumers if there are more developers that also use that app distributor. On the other side, an app distributor is more valuable to developers if there are more mobile device users that purchase from that app distributor because it means the developer can sell its apps to a larger audience. App distributors thus exhibit indirect network effects. App stores are also well-understood to supply simultaneous transactions between users and developers.<sup>32</sup>

42. Because app distribution is a two-sided transaction platforms, only one market should be defined encompassing both sides of the platform.<sup>33</sup> Thus, one should define the market in which the App Store competes as a single two-sided market that includes both the developer side and the consumer side (rather than defining separate markets for each side). On this point, I agree with Apple’s and Epic’s experts in *Epic v. Apple*, who concluded that the App Store is a two-sided transaction platform and that one must include both sides in the relevant market.<sup>34</sup>

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by the presence and observability of a transaction between the two groups of platform users.” Filistrucchi et al., *Market Definition in Two-Sided Markets: Theory and Practice*, 10 J. Comp. L. & Econ. 293, 297-298 (2014).

<sup>31</sup> There may be more than two relevant sides to the App Store platform for purposes other than market definition. For example, one may need to consider the value of Apple’s Search Ads (which are ads within the App Store that app developers may purchase from Apple) if considering Apple’s total ROI on the App Store. However, because Search Ads are unlikely to significantly implicate indirect network effects, they are not necessary to consider for purposes of market definition. See Evans & Noel, *Defining Antitrust Markets When Firms Operate Two-Sided Platforms*, 2005 Colum. Bus. L. Rev. 667, 696 (2005) (“In some cases, the fact that a business could be considered a 2SP may be irrelevant, either because the indirect network effects, though present, are small or because nothing in the analysis of the practices really hinges on the interlinked demand. In other cases, the fact that a business is a 2SP will prove important both for identifying the real dimensions of competition and focusing on sources of constraints.”).

<sup>32</sup> See Cusumano, Yoffie, & Gawer, *The Future of Platforms*, 61 MIT Sloan Management Review 3, p.46, 49 (February 2020); Jansen & Bloemendal, *Defining App Stores: The Role of Curated Marketplaces in Software Ecosystems*, ICSOB 2013: Software Business. From Physical Products to Software Services and Solutions, 195 (June 2013).

<sup>33</sup> Filistrucchi et al., *Market Definition in Two-Sided Markets: Theory and Practice*, 10 J. COMP. L. & ECON. 293, 302 (2014); Filistrucchi, *Market definition in multi-sided markets*, OECD Rethinking Antitrust Tools for Multi-Sided Platforms, 42 (2018).

<sup>34</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶54 (“The iOS App Store... is thus clearly a two-sided transaction platform”); *id.* at ¶88 (“identifying the boundaries of the relevant antitrust product market should ... encompass both sides of the platform. Defining product markets

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43. However, Apple’s experts fail to recognize that correctly implementing two-sided market analysis makes the correct market definition narrower than they claim. The main implication of a single two-sided market is that one must account for demand substitution on both sides of the market (in this case, for both consumers and developers) regarding the transactions at issue. The economic literature advises that in a two-sided transaction market, candidate substitute products must “offer, **to both sides**, the possibility to transact”.<sup>35</sup> Apple’s own expert Professor Schmalensee agrees with this theoretical point, stating, “As a matter of economics, two-sided platforms face competition from other similarly situated two-sided platforms that facilitate **transactions between the same two sets of users**.”<sup>36</sup> Thus, when ranking products in terms of how close a demand substitute they are to Apple’s App Store, it is important to consider not only both consumer substitution and developer substitution in general, but also whether the *transactions between iOS developers and iOS users* on the App Store are functionally interchangeable with *transactions between those same developers and users* for any posited alternative. But despite this principle being clearly delineated in the literature and set out by Prof. Schmalensee himself, Apple’s experts often fail to implement it: Apple’s experts instead rely largely on whether iOS developers and users both *happen to also transact* on other platforms instead of on whether there is sufficient substitutability between the specific sets of transactions themselves.<sup>37</sup>

### 3. How to Objectively Rank the Closest Demand Substitutes to the App Store

44. Economists quantify the extent to which customers “substitute” between two products *A* and *B* by measuring how much an increase in the price of product *A* affects the quantity purchased of product *B*, holding product *B*’s price

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for only one side of the platform—defining a market for developers that excludes consumers—would lead to misleading conclusions”). Evans 2021-03-15 report in *Epic v. Apple* ¶6 (“the App Store, the two-sided transaction platform at the heart of this case...”).

<sup>35</sup> Filistrucchi et al., *Market Definition in Two-Sided Markets: Theory and Practice*, 10 J. COMP. L. & ECON. 293, 303 (2014) (emphasis added); Filistrucchi, *Market definition in multi-sided markets*, OECD Rethinking Antitrust Tools for Multi-Sided Platforms, 42 (2018) (“a two-sided transaction market candidate substitute products constraining the ability of the two-sided transaction platform to raise prices are not only other platforms, which offer, to both sides, the possibility to transact but also non-intermediated transactions.”).

<sup>36</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶90 (emphasis added).

<sup>37</sup> See, e.g. Hitt 2021-02-16 report in *Epic v. Apple* ¶50 (“The fact that consumers and developers multi-home across devices and digital transaction platforms constrains Apple from exercising any alleged market power.”).

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constant.<sup>38</sup> When an increase in the price of product *A* *increases* the quantity purchased of product *B*, economists say the two products are “substitutes” because that indicates that some customers “substitute” (i.e., switch some of their purchases) from product *A* to product *B* when product *A*’s price increases relative to product *B*’s price.<sup>39</sup> The more an increase in the price of product *A* increases the quantity purchased of product *B*, the “closer” product *B* is a demand substitute to product *A*. Thus, product *B* is objectively a closer substitute to product *A* than product *C* is if a given increase in product *B*’s price increases the quantity of product *A* purchased more than an equivalent increase in product *C*’s price does. If one measures these values (the changes in prices and changes in quantity) as percentage changes, then economists call the resulting measure of substitution between the two products the “cross-elasticity of demand” between the two products.<sup>40</sup> Higher cross-elasticities indicate that two products are closer substitutes.

45. As applied here, this means that the extent of “substitution” between two app distributors *A* and *B* turns on how much an increase in the commission (i.e., price) charged by distributor *A* affects the amount of distribution by distributor *B*. Thus, the more an increase in the commission of distributor *X* increases total distribution by the App Store, the closer a substitute distributor *X* is to the App Store.

a. Factors Relevant to Developer-Side Demand Substitution

46. In this case, a single developer “substituting” between app distributors *A* and *B* would mean an increase in the commission of distributor *A* causing the developer to switch from: (1) distributing through either just *A* or both *A* & *B*; to (2) distributing through just distributor *B*. The aggregate amount of developer substitution between distributors *A* and *B* thus turns on the extent to which an increase in the commission of distributor *B* increases the number of apps that developers decide to distribute through distributor *A*. Thus, another app distributor is a closer developer-side demand substitute for the App Store the more an increase

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<sup>38</sup> Pindyck & Rubinfeld, MICROECONOMICS 24 (8<sup>th</sup> ed. 2013) (“Goods are substitutes when an increase in the price of one leads to an increase in the quantity demanded of the other.”).

<sup>39</sup> In contrast, when an increase in the price of product *A* *decreases* the quantity demanded of product *B*, then economists say that the two products are “complements” because such a pattern typically arises only when two products are used together as complements, such as peanut butter and bread.

<sup>40</sup> Pindyck & Rubinfeld, MICROECONOMICS 35 (8<sup>th</sup> ed. 2013) (“A cross-price elasticity of demand refers to the percentage change in the quantity demanded for a good that results from a 1-percent increase in the price of another good.”).



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in the App Store’s commission increases the number of apps that the developer distributes through the other distributor.

47. Any given alternative to the iOS App Store will be a closer developer-side demand substitute the more:

- 1) that the alternative provides the same basic functions that the App Store provides (a curated public storefront, secure transfer of the iOS app installation files, and secure financial transactions when the developer sells apps or sells digital products within an app; and
- 2) that the alternative would *shift* demand for the app away from the App Store by selling to the same consumers on the same devices in the same situations.

48. The first point—that an alternative will be a closer developer-side demand substitute for the App Store when it provides the same basic *functions* of the App Store—is self-evident from the concept of substitutability; the functions are what needs to be (reasonably) substitutable.<sup>41</sup> When an alternative does not provide some of these basic functions, then the developer must incur the cost and inconvenience of self-supplying those functions himself to switch to the alternative, which naturally makes the developer less likely to switch to the alternative.<sup>42</sup> Thus, for example, direct distribution of an iOS app is a more distant substitute to the App Store than a rival iOS app distributor would be because: (a) switching from the App Store to direct distribution would require the developer to incur the costs of setting up a public storefront, handling the secure transfer of the installation files, and handling the secure financial transaction; whereas (b) switching from the App Store to a different iOS app distributor would not require the developer to incur any of those switching costs. This logic extends to alternatives that do not even provide the secure transfer of iOS app installation files. For example, suppose a developer also provided a public website that consumers could use to purchase virtual currency that they could use within a native iOS app. Such a website would not provide for the secure transfer of the iOS app installation files the way the App Store does, and

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<sup>41</sup> See ABA Section of Antitrust Law, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, III.B. (2012) (“do different types of products that serve a similar function compete closely enough to be considered part of the same relevant market?”).

<sup>42</sup> DOJ/FTC HORIZONTAL MERGER GUIDELINES §4.1.3 (2010) (“In considering customers’ likely responses to higher prices, the Agencies take into account any reasonably available and reliable evidence, including, but not limited to: ... objective information about product characteristics and the costs and delays of switching products”).

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consequently would not be as close a substitute to the App Store as another iOS app distributor would be.<sup>43</sup>

49. The second point—that an alternative will be a closer developer-side demand substitute for the App Store the more that it *shifts* demand for the developer’s app away from the App Store—simply implements the logic that a buyer must *actually switch* (or have sufficient potential to *actually switch*) among alternatives for them to be substitutes.<sup>44</sup> An alternative to the App Store shifts demand for an app (or its digital in-app products) away from the App Store if also using the alternative distributor would decrease the quantity demanded of the app (or its digital in-app products) on the App Store.<sup>45</sup> By contrast, if the same participants on the App Store platform just *happen* to also participate in another platform, but there is insufficient actual or potential *shifting of transactions* between the two, it is that level of *shifting* that informs the market definition inquiry.

50. For example, suppose that if a developer distributed its app through just the App Store, it would sell the app to the consumer Bob, but if the developer distributed its app through both the App Store and a rival iOS app distributor, then Bob would instead buy the app from the rival iOS app distributor. In that situation, the rival iOS app distributor shifts the sale of the app to Bob away from the App Store. If Bob is the only consumer, this hypothetical would result in complete (100%) shifting of demand because the total sales of the app if the developer distributes through both the App Store and the alternative are identical to the sales of the app if the developer distributes through only the App Store.

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<sup>43</sup> A separate web site would be a more distant substitute to the App Store than a rival iOS app distributor also because there is generally significantly less demand shifting between a website and a native iOS app than between two identical versions of the same native iOS app, as discussed further below.

<sup>44</sup> ABA Section of Antitrust Law, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.B.2.b.(1) (2012) (“If buyers *would switch* to the next best substitute in volumes sufficient to make the price increase unprofitable, the examining agency expands the candidate market by including this substitute.”) (emphasis added).

<sup>45</sup> It is also theoretically possible for the opposite of demand shifting to occur; i.e., for the quantity demanded of an app for one app distributor to *increase* if the developer decides to also distribute its app through a different app distributor. This would occur if, for example, consumers value the iOS version of an app more if they can also obtain a Windows version of the app. This is plausible if, for example, consumers prefer apps that they can use on both extremely mobile devices (such as iPhones) and less mobile devices (such as video game consoles), so that they can continue to use the same app throughout the day.

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51. In contrast, suppose instead that if a developer distributed its app through just the App Store, Charlie would purchase the app from the App Store, but David would not purchase the app at all. Suppose also that, if the developer also distributed its app through a rival iOS app distributor, Charlie would still purchase the app from the App Store, and David would now purchase the app from the rival app distributor. In this situation, there is *no shifting of demand* because distributing the app through the other distributor did not reduce the sales of the app on the App Store.

52. The concept of shifting demand is thus a straightforward implementation of the requirement from the economic literature on platforms— and stated to by Apple expert Prof. Schmalensee in his own expert report—that “the relevant question is reasonable **interchangeability/substitutability of transactions**” and that substitutes to a transaction platform must be “similarly situated two-sided platforms that facilitate **transactions between the same two sets of users**.”<sup>46</sup>

53. Modeling the developer’s decision about which app distributor(s) to distribute through in these two extreme examples (100% demand shifting and 0% demand shifting) makes clear that *developers will substitute more between any given pair of app distributors the more demand for the developer’s app (and in-app products) shifts between the two distributors*.<sup>47</sup>

54. If there is 100% demand shifting between the two distributors A and B, then the developer sells the same quantity of its app regardless of whether it distributes through just A, just B, or both A&B.<sup>48</sup> With 100% demand shifting, the developer’s profit-maximizing decision will always be to distribute *only through the distributor that provides the lowest commission*.<sup>49</sup> The developer will sell the same

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<sup>46</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶90 (emphasis added).

<sup>47</sup> This is a general, overarching point that applies regardless of whether the two distributors are compatible with the same operating system. It therefore provides a consistent framework to compare developer-side demand substitution between both: (a) pairs of distributors that distribute to the same operating system, like the Google Play store and the Samsung Galaxy Store; and (b) pairs of distributors who distribute to different operating systems, like the iOS App Store and the Google Play Store.

<sup>48</sup> Mathematically, if there is 100% demand shifting, then  $Q_{A\&B} = Q_A = Q_B$ , where  $Q_{A\&B}$  is the quantity of the developer’s app purchased if it distributes through both A and B,  $Q_A$  is the quantity of the developer distributes through only A, and  $Q_B$  is the quantity of the developer distributes through only B.

<sup>49</sup> For simplicity, this hypothetical assumes the price of the app is the same for both app distributors.

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quantity of its app either way, so the developer’s marginal profits from selling the app will be highest if it sells only through the distributor that provides a lower commission.<sup>50</sup> In other words, with 100% demand shifting, deciding to distribute through not only the lower-commission distributor, but also the higher-commission distributor, would *decrease* the developer’s profits by requiring the developer to pay a higher commission on the sales that the higher-commission distributor shifts away from the lower-commission distributor. Because the developer always decides to distribute only through whichever distributor provides the lowest commission with 100% demand shifting, *there is extremely high developer-side substitution between the two distributors with 100% demand shifting.*

55. In contrast, if there is 0% demand shifting between the two distributors A and B, then the total quantity sold of the app if the developer distributes through both A & B equals the sum of: (i) the quantity sold if the developer distributed only through A; and (ii) the quantity sold if the developer distributed only through B.<sup>51</sup> With 0% demand shifting, the developer’s profit-maximizing decision is always to distribute simultaneously through both A & B, even if one distributor’s commission is much higher than the other’s. If the app distributors do not shift demand away from each other, then deciding to distribute through not only the lower-commission distributor, but also the higher commission distributor, will necessarily increase the developer’s marginal profits because distributing also through the higher commission distributor does not reduce the quantity sold through the lower-commission distributor. Because with 0% demand shifting developers always decide to distribute through both the distributors regardless of their relative commission, *there is zero developer substitution between app distributors who do not shift demand away from each other at all.*

56. The two extreme examples shown above illustrate the general principle that *the more a pair of app distributors shift demand away from each other, the more developers will substitute between the two distributors based on commission changes.* As applied to this case, that means an alternative to the App Store will be

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<sup>50</sup> Mathematically, the developer’s marginal profit from selling the app is  $QPR$ , where  $Q$  is the quantity sold,  $P$  is the price, and  $R$  is the royalty percentage (which is 100% minus the distributor’s commission percentage). With 100% demand shifting, then  $Q_{A\&B} = Q_A = Q_B$ , so the  $QP$  portion of the developer’s marginal profit formula is the same regardless of whether the developer distributes through just A, just B, or both A & B. Consequently, with 100% demand shifting the developer’s marginal profits are highest if it distributes through whichever distributor has the highest royalty rate  $R$  (i.e., the lowest commission).

<sup>51</sup> Mathematically, 0% demand shifting between two distributors A and B implies that  $Q_{A\&B} = Q_A + Q_B$ .



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a closer developer-side demand substitute the more that alternative shifts demand for app sales and/or in-app sales of digital products away from the App Store. Consequently, when ranking alternatives to the App Store in terms of developer-side demand substitution, a key fact is how much the alternative shifts demand away from the App Store; an alternative *A* is a closer developer-side demand substitute to the App Store than an alternative *B* if the alternative *A* shifts more demand away from the App Store than the alternative *B* does, holding all else equal.

57. An alternative app distributor will shift demand away from the App Store more the more that the *same consumers* use the *same apps* distributed by the alternative on the *same devices* in the *same situations* as they do for apps distributed by the App Store.

58. For example, a rival iOS app distributor that distributes the same native iOS app to a given consumer as the App Store does could shift 100% of that consumer’s demand away from the App Store. This is because the app distributed by the rival iOS app distributor would be identical to the app distributed by the App Store, the consumer would be identical, the device (the consumer’s iOS device) would be identical, and therefore the consumer would use the app in all the same situations. Put simply, the consumer could use the version of the app they obtained from the rival iOS app distributor in every situation in which they would have otherwise used the version obtained from the App Store. For this reason, one would generally expect *significant demand shifting* and therefore *high developer-side demand substitution between the App Store and rival iOS app distributors*.

59. In contrast, an *Android* app distributor (such as the Google Play Store) would shift away significantly less of the App Store’s demand for an app, even if the app’s Android version had the exact same functionality as its iOS version, because less than 2% of consumers who own iOS smartphones also own an Android smartphone.<sup>52</sup> Instead of reporting this fact, Apple’s expert Professor Hitt relies on

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<sup>52</sup> A March 2017 survey of 1069 US iPhone owners conducted by Apple’s own Market Research team found that only 54 of those owners owned an additional phone, 27% of whom owned an Android and 8% of whom said they did not know what their additional phone was. APL-EG\_07516416 at 841. If one conservatively assumes all those 8% all also owned Android smartphones, that means at most 35% of those 54 (or 19) also had an Android smartphone, meaning there were at most 1.8% of iPhone users (19/1069) who also owned an Android smartphone at that time.



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data suggesting that 21-22% of iPhone users own a non-iOS *tablet*.<sup>53</sup> But the less than 2% of iPhone users who own an Android smartphone is far more relevant because some apps are designed more for smartphones than for tablets, and even for apps that are not, many consumers might not want to shift to using an app on a tablet because of the convenience of a smartphone.<sup>54</sup> In any event, even Professor Hitt’s statistic indicates that only 23-24% of iPhone users could switch to an app on any non-iOS smartphone *or* tablet. Thus, either way, the lion’s share of iPhone users could not switch to an Android app distributor even for Android apps that have the exact same functionality as iOS apps.

60. Similarly, there are significantly fewer situations in which, if a developer decided to distribute their app through not only the App Store, but also an Android app distributor, a consumer would purchase a digital in-app product in the Android version of an app when they otherwise would have purchased the digital in-app product from the version they obtained through the App Store on an iOS device. For this reason, one would generally expect *significantly less demand shifting*, and therefore *significantly less developer-side demand substitution between the App Store and Android app distributors*.

61. This general phenomenon—high demand shifting rates (and therefore high substitution rates) between distributors who target the same operating system, and low demand shifting rates (and therefore low substitution rates) between distributors who target different operating systems—will apply *regardless of whether an app is compatible with a single operating system or with multiple operating systems*. When an app is compatible with only a single operating system, there will be *zero demand shifting* (and therefore zero developer-side demand substitution) between app distributors on different operating systems because the app can only be run on a single operating system. An app compatible with only a single operating system will, in contrast, exhibit significant demand shifting, and therefore significant developer-side demand substitution, between different app distributors on the same operating system that the app is compatible with. When an app is compatible with multiple operating systems, such as both with Android and

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<sup>53</sup> See Hitt 2021-02-16 Opening Report in Epic v. Apple, ¶81. [REDACTED]

<sup>54</sup> Even for the rare consumers who own and use both Android and iOS smartphones simultaneously, there will be little demand shifting between the Android app distributor and the App Store if the consumers are using their Android smartphones in different situations than when they are using their iOS smartphones; if, for example, they use their Android smartphone for work and their iOS smartphone is for personal use.

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iOS, it can be distributed through app stores for both. For example, mobile game apps, which usually rely on the multi-platform Unity engine,<sup>55</sup> are usually distributed through both the leading iOS app distributor (the iOS App store) and the leading Android app distributor (the Google Play Store).<sup>56</sup> Even in this situation, one would still expect little demand shifting between the App Store and an Android app distributor because the two distributors would be primarily distributing the app to *different consumers* (and necessarily on *different devices*), given how that (as just discussed above) less than 2% of iOS smartphone owners also own an Android smartphone.<sup>57</sup> Thus the existence of such “multi-homing” does not support a conclusion that the Google Play Store is a close developer-side demand substitute for the iOS App Store. Apple’s experts miss this crucial point, and so incorrectly tout evidence of “multi-homing” on the iOS App Store and the Google Play Store as evidence of substitution between the two app distributors, when in fact that evidence does not support their conclusion.<sup>58</sup>

62. Put differently, the fact that a developer *happens* to distribute their app to iOS users through App Store transactions, and *also happens* to distribute their app to Android users through Play Store transactions, *does not in and of itself* establish that the two modes of distribution are substitutes. The reason is that such parallel distribution says nothing about whether one mode of distribution shifts demand away from the other or the degree of such shifting (i.e., the extent to which developers or users actually *switch* the level of distribution among the two platforms, to the extent a given user is even present on both).

b. Factors Relevant to Consumer-Side Demand Substitution

63. The App Store does not charge consumers to participate in its platform; Apple neither requires consumers to pay fixed fees to join the platform nor charges consumers any fees each time they use the platform to obtain an app or purchase a

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<sup>55</sup> Unity, *Build once, deploy anywhere* (available at <https://unity.com/features/multiplatform>, last accessed May 18, 2021) (“Unity for mobile. Create stunning, performant experiences backed by the platform that was used to create over half of the top 1,000 mobile games on the Apple App Store and Google Play.”).

<sup>56</sup> Hitt 2021-03-15 report in Epic v. Apple Exhibit 3.

<sup>57</sup> As discussed above, it is rare for a given consumer to use both an Android phone and iOS phone simultaneously.

<sup>58</sup> See, e.g., Hitt 2021-03-15 report in Epic v. Apple ¶139 (“To respond to Dr. Evans’ conclusions regarding lack of substitutability, I provide additional evidence on multi-homing....”).



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digital in-app product.<sup>59</sup> Nor are consumers charged by any of the other most successful app distributors, including when app distribution is more competitive, as with the distribution of Windows or macOS apps.<sup>60</sup> Thus, consumers do not directly observe or pay a “price” for app distribution.

64. Nonetheless, an increase in the commission an app distributor charges *developers* can decrease *consumer* demand for that app distributor if the developers’ responses to the higher commission makes the app distributor less appealing to consumers. Specifically, an increase in an app distributor’s commission could make the app distributor less appealing to consumers if the increase in the commission caused developers to:

- a) stop distributing some of their apps through that app distributor;
- b) stop selling some of their digital products within apps distributed by that distributor;
- c) raise the prices (or decrease the quality) of some of their apps for that app distributor;
- d) raise the prices (or decrease the quality) of some of the digital products that can be purchased within apps distributed by that distributor.<sup>61</sup>

65. Thus, an increase in the commission an app distributor charges developers can decrease the appeal of the app distributor to a consumer by adversely affecting that distributor’s app or IAP prices, quality, or array of offerings.

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<sup>59</sup> Schmalensee 2021-03-15 report in *Epic v. Apple* ¶50 (“the App Store did not charge consumers access fees when it launched, and still does not.”); *id.* ¶79 (“In order to encourage consumers’ use of the App Store, Apple does not charge consumers access or transactions fees on the App Store platform.”).

<sup>60</sup> Steam does not charge consumers any fees for joining the platform (it is free to download) or using the platform; Steam instead charges developers a 20-30% commission when they make a sale through the Steam store. *See* Steam Team, *New Revenue Share Tiers and other updates to the Steam Distribution Agreement* (published November 30, 2018, available at [steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838](https://steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838)). Nor does the Microsoft Store charge consumers an access fee (it comes pre-installed on the Windows operating system) or transaction fees; it instead charges commissions to developers. *See* Microsoft Store Developer Agreement (available at <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4o4bH>). Nor does the Epic Game Store charge consumers an access fee (it is free to download) or transaction fees; it instead charges a 12% commission to developers. *See* Epic Games, *Epic Game Store FAQ* (available at <https://www.epicgames.com/store/en-US/about>).

<sup>61</sup> While my market definition analysis accounts for the theoretical possibility that a developer might pass on a portion of the commission increase to consumers in the form of higher app prices, I offer no opinion on whether in this case there would actually be any such pass through given the economics of this market and the fact that apps are typically priced at \$0.99 tiers.



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Nonetheless, a decrease in the appeal of the distributor to the consumer will not necessarily cause the consumer to switch to an alternative if that decrease was not sufficiently large to make an alternative more appealing to the consumer. Moreover, the mere fact of some switching would not answer whether that switching is sufficient to constrain a monopolistic price increase, which is the ultimate inquiry.

66. Economists generally assume that, when a consumer is presented with a discrete number of mutually exclusive options, the consumer will choose whichever option provides it with the highest consumer surplus, which equals the value of the option to the consumer minus the price the consumer must pay for that option.<sup>62</sup> Here, although the consumer pays no price for participating in the app distributor’s platform, from the consumer’s perspective she is paying the app distributor the price of the app in exchange for right to install the app. Thus, a given consumer’s “surplus” from purchasing an app from a particular app distributor equals the value of obtaining the right to install the app from that app distributor minus the price of obtaining the app via that app distributor. The consumer’s value from obtaining the right to install the app from that app distributor will depend primarily on: (1) the value of the app to that consumer given the app’s features; (2) the devices on which the consumer could install the app; (3) how trustworthy or secure the app distributor is (e.g., how unlikely the app distributor is to distribute a malicious or fraudulent app); and (4) the number and quality of other apps available from the app distributor.

67. For example, suppose a given consumer is interested in only a single app that is available from two app distributors: the iOS App Store and the Google Play Store (an Android app distributor). Suppose also that the app is the same price (\$1.99) on both stores, and that the consumer believes the app would provide \$3.00 worth of value if they could use it on their smartphone. This hypothetical consumer therefore has three discrete options: (1) purchase the app from the iOS App Store; (2) purchase the app from the Google Play Store; or (3) do not purchase the app at all. If this consumer owns an iPhone but not an Android phone, then: (1) purchasing from the App Store would provide positive \$1.01 in consumer surplus; (2) purchasing from the Google Play Store would provide *negative* \$1.99 in consumer

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<sup>62</sup> PINDYCK & RUBINFELD, MICROECONOMICS 133 (8<sup>th</sup> ed. 2013) (“Individual consumer surplus is the difference between the maximum amount that a consumer is willing to pay for a good and the amount that the consumer actually pays.”). Economists often include the decision not to purchase anything amongst the set of discrete choices, which ensures that the choice that provides maximum consumer surplus necessarily does not have negative consumer surplus. See ABA Section of Antitrust Law, Econometrics 78 (2d ed. 2014) (“The set of choices frequently includes a “none of the above” choice (referred to as the outside option)”).

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surplus (zero value minus the \$1.99 price); and (3) not purchasing the app would produce zero consumer surplus. This consumer would therefore choose to purchase the app from the App Store because that choice would provide the maximum consumer surplus. In this particular hypothetical, there would be zero consumer-side demand substitution between the iOS App Store and the Google Play Store in response to changes in the prices of apps. One must account for this dynamic when ranking the Play Store as a substitute to the App Store, because they generally cannot distribute to the same set of consumers given that less than 2% of iPhone owners also own an Android smartphone.<sup>63</sup>

68. In contrast, suppose instead that there were two distinct iOS app distributors available to this iPhone-owning consumer (instead of just the App Store). If the two distributors were otherwise identical, then the consumer would purchase the iOS app from whichever iOS app distributor had the lower price for the app. That would imply extremely high consumer-side demand substitution between the two identical iOS app distributors if the distributors’ commissions caused the developers to alter their prices.

69. These fundamentals provide two key insights about consumer-side demand substitution between app distributors:

- 1) Consumers are more likely to substitute between app distributors in response to an increase in a distributor’s commission the more that developers substitute between app distributors in response to that commission change. Therefore, *evidence of relatively high developer-side demand substitution* between two app distributors also indicates relatively higher consumer-side demand substitution between two app distributors, holding all else equal.<sup>64</sup>
- 2) Consumers are more likely to substitute between distributors in response to an increase in a distributor’s commission the more that consumers substitute between those distributors in response to changes in the number, quality, and prices of apps and digital in-app products.

70. Consumers are more likely to substitute from the App Store to an alternative the lower the costs to the consumer of switching to the alternative (i.e., the lower the “switching costs”) when they would otherwise be using the native iOS

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<sup>63</sup> See *supra* note 52.

<sup>64</sup> The logical corollary is that evidence of *relatively lower* developer-side demand substitution between two app distributors also indicates *relatively lower* consumer-side demand substitution between two app distributors, holding all else equal.

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apps obtained from the App Store. To be clear, these costs include not just monetary costs, but also time and inconvenience.

71. Thus, a consumer is more likely to substitute between the App Store and an alternative for the *purchase of an app* the less often the user would incur costs from using the app from the alternative when they otherwise would have used the app obtained from the App Store. If the alternative is a rival iOS app distributor, the consumer will incur few (if any) costs or inconveniences from using the version of an iOS app obtained from a rival iOS app distributor instead of the version from the App Store, given that both versions will be usable on the same devices and will have the same functionality; the consumer will have an identical experience with the app either way. In other words, the consumer will get to use the same app on the same device regardless of which iOS app distributor he uses, so obtaining the app from the rival iOS app distributor instead of the App Store would be unlikely to inconvenience the consumer.

72. In contrast, if the alternative is a non-iOS distributor, such as the Sony PlayStation store (which can distribute only non-iOS apps on Sony PlayStation game consoles),<sup>65</sup> then buying the non-iOS version of the app from the PlayStation store is a weaker substitute for consumers who own iOS devices, for several reasons. First, only 14-20% of iOS device owners own a Sony PlayStation,<sup>66</sup> and thus the lion’s share of them could not switch to purchasing an app on the Sony PlayStation store. Second, many iOS apps are not even available in a non-iOS version compatible with the Sony PlayStation,<sup>67</sup> and thus even iOS device owners who also

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<sup>65</sup> Deposition of C.K. Haun (Apple’s Senior Director for Technical Services) at 51-52 (“A: iOS applications are provided to our retail customers through the iOS App Store. . . . iOS applications are provided to customers through the iPhone, iOS App Store. *There is no other methodology available.*”) (emphasis added).

<sup>66</sup> Apple Expert Professor Hitt acknowledges that only 21-30% of iPhone owners also owned any gaming console, including PlayStation or Xbox. *See* Hitt 2021-02-16 Opening Report in Epic v. Apple, ¶81. Given that PlayStation constitutes two thirds of the of the gaming console market, <https://gs.statcounter.com/os-market-share/console/worldwide>, this indicates that only 14-20% of iPhone owners also own a Sony PlayStation.

<sup>67</sup> Many iOS apps are not available on the PlayStation and other high-end video game consoles in part because iOS devices (such as iPhones and iPads) have very different methods of user input. iOS devices rely almost exclusively on users interacting with the device through a touchscreen without physical buttons, whereas video game consoles instead rely primarily on users interacting through a dedicated video game controller with physical buttons and no touch screen. These substantial differences in user input mean that apps designed for use with a touchscreen (such as those found on iOS devices) often will not function at all (or well) if used with a video

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owned a Sony PlayStation could hardly ever switch to buying a non-iOS version of iOS apps on the Sony PlayStation store. Further, ownership of a PlayStation and having a version of the app compatible with a PlayStation are necessary but not sufficient conditions for switching. The third obstacle is that, even for iOS device owners who meet both conditions, they would often be inconvenienced by getting the non-iOS version of the app from the PlayStation store instead of the iOS version from the App Store because they could never play the app when they had access to their iPhone but not their PlayStation console, which would generally happen whenever they were not right in front of the television into which the console was plugged.<sup>68</sup> Because even these consumers would often incur significant inconvenience costs if they obtained the app from the PlayStation store instead of the App Store, that makes them less likely to substitute from the App Store and the Sony PlayStation store in response to a change in the quantity, quality, or prices of the apps on the App Store.

73. Similarly, a consumer is more likely to substitute between the App Store and an alternative for *the purchase of a digital in-app product* the less the consumer would incur costs from purchasing the digital in-app product via the alternative when they otherwise would have used the version of the app distributed by the App Store. For example, suppose that, in a particular iOS app, the consumer can use real money to purchase virtual items that they can use in the app, such as a virtual weapon to use in a game. If the alternative to the App Store were another iOS app distributor, then the consumer will incur few (if any) costs or inconveniences from purchasing the virtual weapon from within the version of the

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game controller, and vice versa. Further, mobile devices have significantly less processing power than high-end video game consoles like the PlayStation, and consequently mobile apps and games are typically simpler and use less realistic graphics than video game console apps and games. Tony Brown, *Mobile vs. PC vs. Console Gaming: Which is Best?* (published August 5, 2020, available at <https://www.gamespace.com/all-articles/news/mobile-vs-pc-vs-console-gaming-which-is-best/>) (“Overall, mobile gaming provides a much more portable option than any other platform with games that are, generally, much cheaper. Although they are also shorter and lower in quality than you’d find on a PC or console.”).

<sup>68</sup> Although the PlayStation 5 has a “remote play” option that allows to wirelessly stream the game from the console to another device (such as an iPhone), this function works only when the PlayStation console and the phone are on the same WiFi network. PlayStation, *PS Remote Play* (available at <https://www.playstation.com/en-us/remote-play/>) (“Remote play cannot be used on your mobile device’s cellular data network.”). See also Deposition of C.K. Haun (Apple) at 170-171 (“A: There are times in my day-to-day life when I would like to either clear my mind or enjoy myself by playing a game, and I may not have access to my Mac, PlayStation, Xbox. I may only have a mobile device with me and that allows me to satisfy that desire.”).



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app distributed by the rival iOS app distributor rather than from within the version distributed by the App Store.

74. In contrast, suppose instead that the alternative to the App Store is a Windows app distributor (such as the Microsoft Store). In many situations, it will not even be possible for the consumer to substitute from the App Store to the Windows app distributor for the purchase of the digital in-app product because a large percentage of iOS device owners do not own Windows computers<sup>69</sup> and many iOS apps are not available in Windows versions. For example, only [REDACTED] of the top iOS apps (weighted by revenue) are also available on the leading Windows app distributor, Steam.<sup>70</sup> But even in the rare situations in which the owner of an iOS device also owns a Windows PC and a Windows version of the same iOS app is available on Windows, the user would have to incur several inconveniences to substitute from purchasing the virtual item on the iOS version of the app obtained from the App Store to the version of the app obtained from the Windows distributor. The consumer would at the very least have to stop using their app on iOS, physically move to the location of their Windows computer, open the app on the Windows computer, purchase the virtual item on the Windows computer, then open the app on the phone, and return to playing.<sup>71</sup> These inconveniences make a consumer relatively less likely to substitute from purchasing a virtual item on an App Store version of an app to purchasing the same virtual item on a Windows app distributor’s version of an app.

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<sup>69</sup> According to Apple’s expert Professor Hitt, 45% of iPhone owners do not own a Windows PC or desktop. *See* Hitt 2021-02-16 Opening Report in *Epic v. Apple*, ¶81.

<sup>70</sup> [REDACTED]

[REDACTED] This analysis relies on programming code that identifies which apps are on both the iOS app store and Steam by comparing the names of the apps on both platforms.

<sup>71</sup> Depending on the situation, a consumer in this situation might also have to incur the additional inconvenience costs of turning on their Windows computer, installing the Windows app, and somehow refreshing the iOS version of the app so that it detects that the consumer has purchased the virtual item (the developer’s server must somehow communicate to version of the app on the consumer’s iPhone that the virtual item purchased on the consumer’s account in the Windows PC version should now also be available in the iOS version).

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75. Another factor that makes consumers less likely to switch to other app distributors to purchase digital in-app products is that app distributors generally use “anti-steering” or “anti-circumvention” rules to prevent developers from steering consumers towards alternative methods of selling digital products. For example, the App Store’s review guidelines prohibit apps distributed by the App Store from including any “buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than [Apple’s] in-app purchase.”<sup>72</sup> The Google Play Store also includes similar anti-steering rules,<sup>73</sup> as does the Microsoft Store.<sup>74</sup> These anti-steering rules thus prevent developers from telling consumers within the apps distributed by higher-commission distributors that consumers could obtain the same in-app products for lower prices if they instead purchased them within the apps distributed by the lower-commission distributors. Consequently, consumers may often not even be *aware* that they could purchase a given in-app digital product at a lower price if they substituted to an app distributed by a different distributor. And if consumers are not even aware of those potential savings, they obviously cannot substitute based on those (unbeknownst to them) potential savings. This means that, in general, whenever a consumer gets an urge to buy an in-app product, they will typically purchase it from within whatever version of the app they happen to be using

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<sup>72</sup> App Store Review Guidelines §3.1.1 (“Apps and their metadata may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than in-app purchase.”); *id.* §3.1.3 (“Apps ... cannot, either within the app or through communications sent to points of contact obtained from account registration within the app (like email or text), encourage users to use a purchasing method other than in-app purchase.”); Schmalensee 2021-03-15 report in *Epic v. Apple* ¶288 (“the App Store’s anti-circumvention rules, which require that developers use IAP to process payments for digital in-app content, have the same economic function as the anti-steering rules at issue in the Amex case. As discussed above in Section III.B, both serve to prevent free-riding”).

<sup>73</sup> Google Play Console Help, *Payments* (available at <https://support.google.com/googleplay/android-developer/answer/9858738>) (“Apps other than those described in 2(b) [purchases of physical goods and services] may not lead users to a payment method other than Google Play’s billing system. This prohibition includes, but is not limited to, leading users to other payment methods via: An app’s listing in Google Play; In-app promotions related to purchasable content; In-app webviews, buttons, links, messaging, advertisements or other calls to action; and In-app user interface flows, including account creation or sign-up flows, that lead users from an app to a payment method other than Google Play’s billing system as part of those flows.”).

<sup>74</sup> Microsoft Store Policies version 7.1.3 (effective May 15, 2021) (available at <https://docs.microsoft.com/en-us/windows/uwp/publish/store-policies#108-financial-transactions>) (§10.8.1 “You must use the Microsoft Store in-product purchase API to sell digital items or services that are consumed or used within your product. Your product may enable users to consume previously purchased digital content or services, but must not direct users to a purchase mechanism other than the Microsoft Store in-product purchase API”).



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at the time, rather than opening up a separate version to try to make the in-app purchase at a potentially lower price.

*4. The Closest Demand Substitutes for the iOS App Store Would By Definition Be Other Third-Party Distributors of Native iOS Apps*

76. For any given product, the closest possible demand substitute is by definition a product that performs the exact same functions. For example, the closest possible demand substitute for one surgical scalpel is another surgical scalpel, and other implements used for cutting things, like a pocket knife, are necessarily more distant, partial substitutes even though they do provide some of the same functionality. Potential substitutes that provide *all* of the *exact same* functions as the defendant’s product at issue are by definition the closest, most complete substitutes for the defendant’s product.

77. Here, the only substitutes that can perform all of the exact same functions as Apple’s iOS app stores are other distributors of native iOS apps. Rival iOS app distributors are the only substitutes that can distribute iOS apps while providing all of the key distribution functions that the App Store provides: (a) a curated storefront of apps available to consumers, (b) a mechanism for transferring the app installation files to consumers, and (c) a secure transaction mechanism when developers sell apps to consumer or make sales of digital products within apps.

78. In the actual world, Apple’s iOS app stores (principally the App Store) were virtually the only iOS app distributor because Apple’s exclusive restraints excluded all but some fringe rival iOS app distributors. As Part III explains, Apple’s contracts with developers (namely its Xcode and Apple SDK agreement, Apple Developer Program License Agreement, and Enterprise Program License Agreement) include terms that restrain developers from distributing native iOS apps through rival iOS app distributors. Part III further explains that Apple has reinforced those contractual restraints with technological restraints that make it harder for developers to violate the contractual restrictions, for example, by making apps installed via “Free provisioning” artificially expire after 7 days.

79. Consequently, in the actual world the only rival iOS app distributors have been some fringe distributors who are willing and able to both violate Apple’s contractual conditions and circumvent Apple’s technological restraints. These include TuTuApp (an app store that uses Enterprise certificates in violation of

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Apple’s agreements); AltStore (an app store that attempts to distribute apps through free Xcode provisioning); and Cydia (a jailbreak app store).<sup>75</sup>

80. In contrast, but-for Apple’s challenged conduct, there would be many more rival iOS app distributors. For example, Apple does *not* use the challenged conduct in *macOS* app distribution,<sup>76</sup> and consequently developers usually use app distributors other than Apple’s Mac App Store to distribute macOS apps.<sup>77</sup>

81. Because Apple has anticompetitively foreclosed competition from what would otherwise be the most significant rival iOS app distributors, in this report I generally say that rival iOS app distributors *would be* the closest substitutes for the iOS app store *in an unrestrained market*. The fringe rival iOS app distributors that exist in the actual world are limited to developers and consumers who are willing to violate Apple’s contractual restraints and able to circumvent Apple’s technological restraints, and consequently are relatively more distant substitutes to the App Store. In the but-for world, none of the rival iOS app distributors would be limited to developers and consumers who violate the contractual restraints and circumvent the technological restraints because those restraints by definition would not exist in the but-for world. Because the key question for market definition is how much the price of a 100% monopolist would exceed the price if the market were *competitive* (i.e., unrestrained), this ranking step should include all substitutes that *would exist if the market were unrestrained*, rather than just the smaller set of substitutes that actually exist in the actual world, given the anticompetitive restraints.

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<sup>75</sup> See *infra* Part II.A (market shares) & Part III.B (methods of installing iOS apps).

<sup>76</sup> Apple’s contractual agreements with developers explicitly do not apply the distribution restraints on iOS to macOS. See Apple Xcode and Apple SDKs Agreement §2.4; Apple DPLA (Exhibit B to consolidated complaint of Developer Class), Purpose (“Applications developed for macOS can be distributed through the App Store, if selected by Apple, or separately distributed under this Agreement.”); *id.* §7 (“Applications for macOS may be submitted to Apple for selection and distribution on the App Store, or may be separately distributed.”). Further, Apple’s macOS operating system programming code does not restrict consumers from installing macOS apps outside the Mac App Store. Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>) (“By default, the security and privacy preferences of your Mac are set to allow apps from the App Store and identified developers. For additional security, you can chose [sic] to allow only apps from the App Store”).

<sup>77</sup> One survey indicates that 47% of macOS developers sell their apps both on the Mac App Store and outside the Mac App Store, and 32% of macOS developers distribute their apps exclusively outside the Mac App Store. See SetApp, Mac Developers Survey 2019 (available at <https://cdn.setapp.com/blog/images/Annual-Setapp-Mac-Market-Survey-2019.pdf>) , 5<sup>th</sup> slide, titled “Choosing the marketplace”).

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82. Below, I explain why, in the absence of the challenged restraints, rival iOS app distributors would be close, complete substitutes for Apple’s iOS app stores, from the perspectives of both: (a) developers; and (b) consumers.

a. Developer Substitution

83. For developers, rival iOS app distributors would be close, complete substitutes for Apple’s iOS app stores in the but-for world because:

- i. Rival iOS app distributors provide all of the same basic functions that the Apple’s iOS app stores provide (a curated public storefront, secure transfer of iOS app installation files, and secure financial transactions); and
- ii. Rival iOS app distributors would significantly shift demand away from the Apple’s iOS app stores.

84. *i. Rival iOS App Distributors Would Provide All the Same Basic Functions That Apple’s iOS App Stores Provide.* Because Apple foreclosed rival iOS app distributors in the actual world, one cannot directly observe the extent to which rival iOS app distributors would provide the same functions that the App Store provides in an unrestrained market. Nonetheless, the evidence shows that it is commonplace for app distributors besides Apple to provide these types of functions in other channels that are more competitive. For example, in Windows app distribution, Steam, the Epic Game Store, and the Microsoft Store all provide: (a) a curated public storefront, (b) secure transfer of the app installation files for the relevant operating system (Windows instead of iOS), and (c) secure financial transactions.<sup>78</sup> Consequently, one would expect rival iOS app distributors to likewise provide curated public storefronts, securely transfer iOS app installation files, and provide a method for secure financial transactions, just like the App Store does. This complete overlap in functionality between the iOS App Store and the

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<sup>78</sup> Steam’s public storefront on the internet is <https://store.steampowered.com/>. The Microsoft Store’s public storefront on the internet is <https://www.microsoft.com/en-us/store/apps>. The Epic Game Store’s public storefront is <https://www.epicgames.com/store/en-US/>. All three of these Windows app distributors have “launcher” apps that users can install to download and install apps they purchase from the app distributor. See Steam Launcher (available at <https://store.steampowered.com/about/>); Epic Game Store Launcher (available at <https://www.epicgames.com/store/en-US/download>). The Microsoft Store application comes preinstalled on Windows. See Luke Jones, *Windows 10: How to Uninstall the Microsoft Store (aka Windows Store)* (published April 22, 2020, available at <https://winbuzzer.com/2020/04/22/windows-10-how-to-uninstall-the-microsoft-store-xcxwbt/>) (“The Microsoft Store app is baked into all Windows 10 PCs.”). All three Windows app distributors not only offer a secure IAP mechanism, but also mandate that developers use them for digital in-app purchases. See *infra* Section D.

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rival iOS app distributors would make them particularly close substitutes for each other.

85. *ii. Rival iOS App Distributors Would Significantly Shift Demand Away from the App Store.* As explained above in Section 3.a, an alternative app distributor will be a closer developer-side demand substitute for the App Store the more that alternative shifts demand away from the App Store. Because Apple restrained developers from using rival iOS app distributors in the actual world, one cannot directly observe how much iOS app distributors shift demand away from each other. Nonetheless, economic logic indicates there would be extremely high demand shifting rates between the App Store and other rival iOS app distributors in the but-for world because the rival iOS app distributors could distribute *the exact same apps to the exact same consumers (iOS device owners) on the exact same devices (iOS devices)*.

86. Absent Apple’s restraints, it would essentially always be technologically possible for an app that is distributed through the App Store to also be distributed by rival iOS app distributors. Because both the iOS App Store and rival iOS app distributors would be distributing native apps for the same operating system (iOS), developers could generally submit identical or near-identical versions of their apps to multiple iOS app distributors.<sup>79</sup> In general, a developer will need to make slightly different versions of their apps for two distributors who distribute apps to the same operating system only if: (1) one of the app distributors prohibits some of the functionality of the app (for example, if one app distributor prohibited ads within their apps); or (2) consumers could purchase digital products within the app, in which case the developer may need a different IAP application programming interface for each app distributor.<sup>80</sup>

87. Although rival iOS app distributors would be *close* substitutes to the iOS App Store for developers, they would *not* be *perfect* substitutes. This is because the various iOS app distributors would still differ in ways that would cause

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<sup>79</sup> For example, most Android apps that are published on the dominant Android app distributor (the Google Play Store) can also be published on other Android app distributor’s platforms (such as the Amazon Appstore). See Amazon Appstore, *Reach millions of new customers* (available at [developer.amazon.com/apps-and-games](https://developer.amazon.com/apps-and-games), last accessed 10/5/2020) (“Already on Google Play? Over 75% of the mobile and tablet Android apps already work on the Amazon Appstore, with no additional development work needed”).

<sup>80</sup> As discussed below in Section D, the largest app distributors require developers to use the app distributor’s IAP mechanism when the developer sells a digital good in an app the distributor distributed.

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developers to generally prefer certain iOS app distributors on average (vertical differentiation) and in ways that makes different developers’ preferences vary (horizontal differentiation).<sup>81</sup>

b. Consumer Substitution

88. As I explained above in Section B.3.b, consumer-side substitution between the App Store and an alternative app distributor will be higher when: (1) developer-side substitution is higher; and (2) consumers would not be inconvenienced by using the alternative app distributor’s versions of their apps when they would otherwise use the App Store’s versions. Both factors indicate that rival iOS app distributors would have the highest possible consumer-side substitution rate with the App Store absent Apple’s restraints. Rival iOS app distributors have the highest possible developer-side demand substitution of any alternative to the App Store, as just discussed. Further, the consumer is unlikely to be inconvenienced by using the version of the app obtained from the rival iOS app distributor whenever they would otherwise have used the version from the App Store, given that both can be installed on the exact same devices and will typically have the exact same functionality.

*5. Direct Distribution of Native iOS Apps Is the Next Closest Substitute After Other Distributors of Native iOS Apps*

89. The next closest demand substitute to Apple’s iOS app stores (after rival iOS app distributors) is direct distribution of native iOS apps by developers. A developer directly distributes an app when it transfers the data necessary to install the app to the consumer without using an app distributor as an intermediary. Given the two-sided nature of the market, this is a relatively more distant substitute than a full-store iOS app distributor due to weaker indirect network effects; a developer distributing only their own apps necessarily provides less selection to users than if they were to also distribute other developers’ apps.

90. Nevertheless, one would still expect substitution to direct distribution of native iOS apps if the iOS app distribution market were not restrained. In the actual world, there is little-to-no direct distribution of native iOS apps because Apple contractually and technologically restrains developers from distributing native iOS apps to consumers outside of its app stores, as discussed below in Part III. However, when app distribution is more competitive, as with the distribution of Windows or

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<sup>81</sup> See *infra* Part IV.B.1.



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macOS apps, many developers self-distribute, supporting the likelihood that iOS developers could feasibly do the same in the but-for world.<sup>82</sup>

a. Developer Substitution

91. For developers, direct distribution of a native iOS app would (in the but-for world) be a relatively close (but not complete) substitute for Apple’s iOS app stores because:

- i. Apple’s iOS app stores and direct distribution of native iOS apps are both methods that can be used to distribute a native app to an iOS device, but direct distribution does not provide developers with all of functionality of Apple’s iOS app stores.
- ii. Direct distribution of native iOS apps would shift a significant amount of demand away from Apple’s iOS app stores.

92. *i. Direct Distribution of Native iOS Apps Would Provide Some, But Not All of the Basic Functions Provided by Apple’s iOS App Stores.* Direct distribution of native iOS apps is only a *partial* substitute for iOS app distributors (such as the App Store) because direct distribution requires the developers to self-supply all the functions that they pay for from iOS app distributors, namely: (a) providing a public storefront; (b) securely transferring the app installation files to the consumer; and (c) making secure payment transactions with the consumer.<sup>83</sup>

93. *ii. Rival iOS App Distribution Would Likely Shift Demand Away from Apple’s iOS App Stores.* As explained above in Section 3.a, an alternative distribution method will be a closer developer-side demand substitute for Apple’s iOS app stores the more that alternative shifts demand away from Apple’s iOS app stores. Because Apple restrained developers from directly distributing native iOS

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<sup>82</sup> Valve, the company that owns Steam, self-distributes many of its apps through Steam on macOS and Windows. See, e.g., Steam, *Half-Life: Alyx* (available [https://store.steampowered.com/app/546560/HalfLife\\_Alyx/](https://store.steampowered.com/app/546560/HalfLife_Alyx/)). Similarly, Epic self-distributes its Fortnite app to Windows and macOS users via the Epic Game Store. See Epic Game Store, *Fortnite* (available at <https://www.epicgames.com/store/en-US/p/fortnite>). Many smaller Windows developers also self-distribute their apps. See, e.g., Argus Monitor (available at <https://www.argusmonitor.com/>).

<sup>83</sup> Paul Kafasis, *Making More Outside the App Store* (published February 10, 2017, available at <https://weblog.rogueamoeba.com/2017/02/10/piezos-life-outside-the-app-store/#fnr1-20170210piezosales>) (“it’s certainly worth considering what it costs to sell direct. That said, payment processing ranges from about 3-8%, while site hosting (which anyone trying to earn money ought to do anyway), even with downloads, is tremendously cheap. The cost is much lower than Apple’s 30%”).



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apps in the actual world, one cannot directly observe how much direct distribution of native iOS apps would shift demand away from Apple’s iOS app stores in the but-for world. Nonetheless, economic logic indicates there would be high demand shifting rates between the App Store and direct distribution of native iOS apps in the but-for world because such direct distribution could distribute *the exact same apps to the exact same consumers (iOS device owners) on the exact same devices (iOS devices)*.

94. Further, one could potentially estimate the demand-shifting rate between an app distributor for a particular operating system and direct distribution of native apps on that operating system by analyzing app distribution channels that are not restrained by anticompetitive conduct, such as the distribution of Windows or macOS apps.

95. Indeed, with macOS app distribution (where Apple does not use the challenged conduct), multiple developers have reported near-100% demand shifting rates between direct distribution of native macOS apps and distribution through the Mac App Store. For example, the macOS app Piezo was distributed through both the Mac App Store and direct distribution until its developer removed the app from the Mac App Store in February 2016.<sup>84</sup> After the developer removed Piezo from the Mac App Store, it found that “nearly all of those [Mac] App Store sales shifted to direct sales. It appears that nearly everyone who would have purchased Piezo via the Mac App Store opted to purchase directly once that was the only option.”<sup>85</sup> Figure 1 below shows that Piezo’s unit sales when it was distributed both directly and through the Mac App Store were similar to its sales when it was distributed only directly, indicating near-100% demand shifting between the Mac App Store and direct distribution of the macOS app. Because the demand-shifting rate between the Mac App Store and direct distribution of the macOS app was so high, Piezo

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<sup>84</sup> Paul Kafasis, *Making More Outside the App Store* (published February 10, 2017, available at <https://weblog.rogueamoeba.com/2017/02/10/piezos-life-outside-the-app-store/#fnr1-20170210piezosales>)(“Our ... audio recording app Piezo was originally distributed in both the Mac App Store and via direct sales, but it has since left the App Store. The restrictions and limitations of the Mac App Store ultimately led us to remove Piezo on February 12, 2016.”).

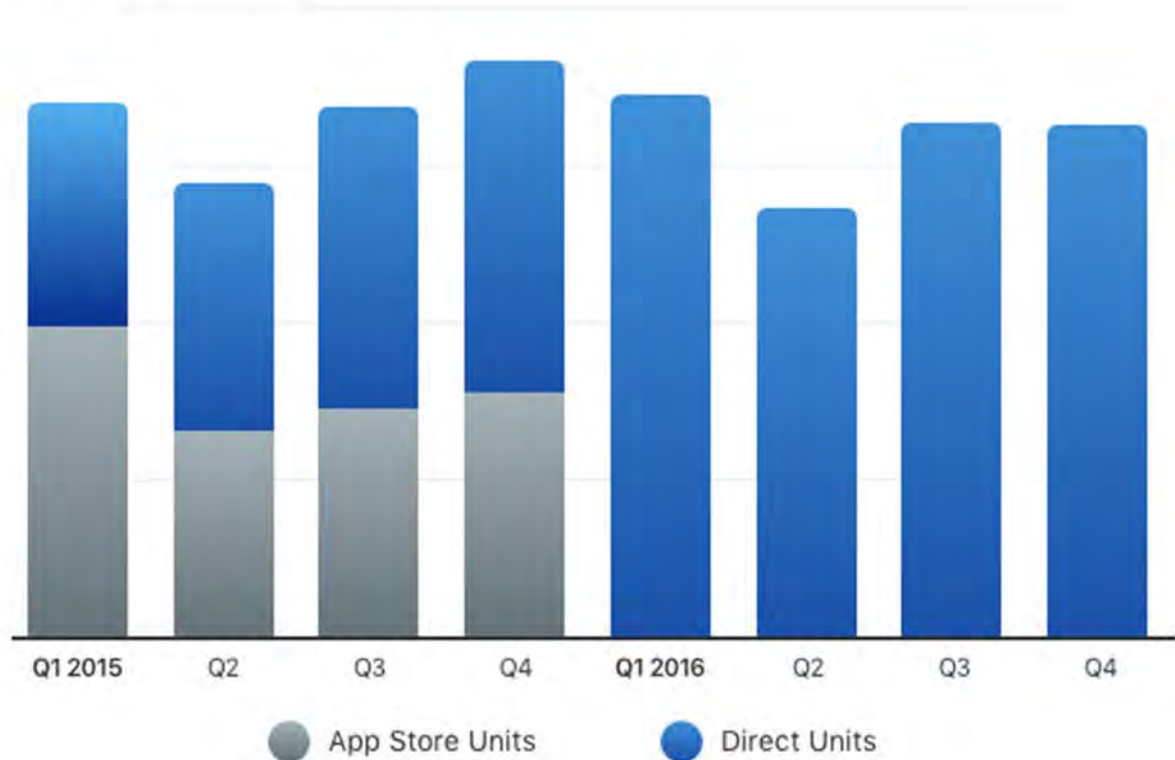
<sup>85</sup> Paul Kafasis, *Making More Outside the App Store* (published February 10, 2017, available at <https://weblog.rogueamoeba.com/2017/02/10/piezos-life-outside-the-app-store/#fnr1-20170210piezosales>).

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actually earned more revenues (net of commissions) when it sold its app only via direct distribution, just as the model I presented above predicts.<sup>86</sup>

**Figure 1: Units sold of the macOS App Piezo, Which the Developer Removed from the Mac App Store in February 2016<sup>87</sup>**

### Piezo Units by Quarter



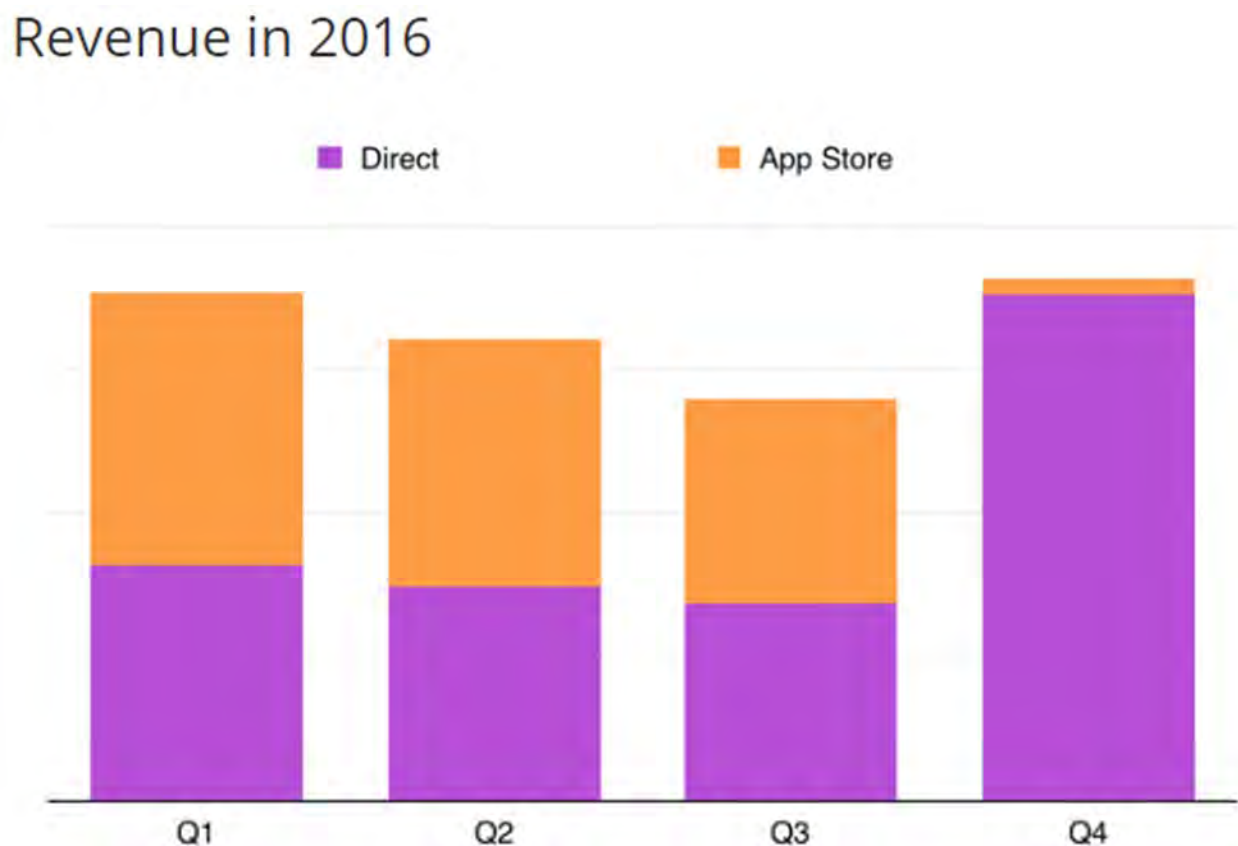
<sup>86</sup> Paul Kafasis, *Making More Outside the App Store* (published February 10, 2017, available at <https://weblog.rogueamoeba.com/2017/02/10/piezos-life-outside-the-app-store/#fnr1-20170210piezosales>)(“In each of the four most recent quarters [since Piezo was removed from the Mac App Store], Piezo brought in more revenue than it had in the corresponding quarter a year earlier. We earned more *revenue* when Piezo was available exclusively through our store than when we provided the App Store as another purchasing option. This result might seem counterintuitive. Piezo’s price remained the same, and unit sales went down, so how could we have earned more revenue? The key to understanding this is remember the cost of being in Apple’s [Mac] App Store—30% off the top of every sale. Despite making slightly fewer sales, we earned more money by avoiding paying that oversized commission to Apple. Direct sales cost us just a few percent, so each direct sales of Piezo earns almost \$5 more than a sale through the Mac App Store.”).

<sup>87</sup> Paul Kafasis, *Making More Outside the App Store* (published February 10, 2017, available at <https://weblog.rogueamoeba.com/2017/02/10/piezos-life-outside-the-app-store/#fnr1-20170210piezosales>).

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96. Similarly, the developer of the macOS app “Dash” distributed the app both directly and via the Mac App Store until Apple removed Dash from the Mac App Store in October 2016.<sup>88</sup> The developer reported that, after Dash was removed from the Mac App Store, “all of Dash’s [Mac App Store] revenue ... migrated to direct sales, with a slight increase.”<sup>89</sup> Figure 2 below shows that Dash’s revenue actually rose slightly when it switched from distributing through both the Mac App Store and direct distribution to distributing only directly, which is consistent with near-100% demand shifting between direct distribution of the macOS app and the Mac App Store.

**Figure 2: Revenue from the macOS App Dash, Which Apple Removed from the Mac App Store in October 2016<sup>90</sup>**



<sup>88</sup> Kapeli, *Apple Has Removed Dash from the App Store* (published October 5, 2016, available at <https://blog.kapeli.com/apple-removed-dash-from-the-app-store>) (“Earlier today, Apple cancelled my developer account and has removed Dash from the App Store. . . Dash for macOS will continue to be supported outside of the App Store.”).

<sup>89</sup> Kapeli, *100 Days Without the App Store* (published January 12, 2017, available at <https://blog.kapeli.com/100-days-without-the-app-store>).

<sup>90</sup> Kapeli, *100 Days Without the App Store* (published January 12, 2017, available at <https://blog.kapeli.com/100-days-without-the-app-store>).

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97. Absent Apple’s restraints, it would usually be technologically possible for a developer that distributes through Apple’s iOS app stores to also directly distribute the native iOS app. Because Apple’s iOS app stores and the direct distribution of native iOS apps both target the same operating system (iOS), developers could often re-use large portions of the code used for any app distributed on Apple’s iOS app stores to make a direct distribution versions of that app.

b. Consumer Substitution

98. For consumers, direct distribution is a relatively close, but incomplete, substitute for Apple’s iOS app stores. As discussed above in Section B.3.b, consumer-side substitution between Apple’s iOS app stores and an alternative will be higher when: (1) developer-side demand substitution is higher; and (2) consumers would not be inconvenienced by using the alternative’s versions of the apps when they would otherwise use the versions on Apple’s iOS app stores.

99. As just discussed, developer-side demand substitution is high between Apple’s iOS app stores and direct distribution of native iOS apps (albeit, slightly lower than between Apple’s iOS app stores and rival iOS app distributors).

100. Further, consumers would be inconvenienced only slightly if they used directly distributed native iOS apps when they would have otherwise used the version on Apple’s iOS app stores. Most importantly, the app itself would work on the exact same device and have effectively the exact same functionality whenever the consumer was using it, regardless of whether the consumer obtained it via Apple’s iOS app stores or direct distribution. Switching from Apple’s iOS app stores to direct distribution of the native iOS app might inconvenience the consumer only in the following relatively minor ways: (a) apps installed via the App Store automatically update in the background, whereas directly distributed iOS apps might not;<sup>91</sup> (b) depending on the method through which consumers could install directly-distributed native iOS apps in the but-for world, the consumer may need to manually save an installation file to their phone’s memory and manually request that the operating system install the app; (c) the consumer would have to personally decide whether to trust the source of the app installation file, rather than relying (at least in part) on the app distributor to ensure that the app installation files were not

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<sup>91</sup> Apple, *How to manually update apps on your Apple device* (available at <https://support.apple.com/en-us/HT202180>) (“On your iPhone and iPad, apps that you download from the App Store are automatically updated by default.”).

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malicious; and (d) the lack of a curated storefront with reviews may discourage consumers who are simply “shopping” for apps, rather than determined to buy a particular app from a particular developer. By comparison, all of the more distant substitutes discussed below would inconvenience consumers significantly more.

*6. All Platforms That Do Not Distribute Native iOS Apps Are Necessarily More Distant, Partial Substitutes*

101. Apple’s economic experts argue that numerous platforms that *cannot distribute native iOS apps* are in the same relevant market as the iOS App Store, which has the main function of distributing native iOS apps. For example, Apple’s economic experts argue that all of the following are in the same relevant market as the iOS App Store:<sup>92</sup>

- Google Play Store (Android app distributor)
- Steam (Windows and macOS app distributor)
- PlayStation Store (app distributor for the Sony PlayStation video game consoles)
- Google Stadia (Cloud gaming)

102. The specific question of whether these platforms that cannot distribute native iOS apps are in the same relevant market as the iOS App Store depends in part on the Hypothetical Monopolist test, which I discuss below in Section C. Putting that question aside for now, there should be no dispute that platforms that *cannot* distribute native iOS apps are *relatively more distant substitutes* to Apple’s iOS app stores than platforms that *can* distribute native iOS apps. For example, an app distributor that can distribute only Android apps (such as the Google Play Store) could not possibly be *as close* a substitute for the iOS App Store as a rival iOS app distributor would be in the absence of Apple’s restraints. To my knowledge, none of Apple’s experts have thus far affirmatively argued that any of non-iOS app distributors (i.e., those do not distribute native iOS apps) are as close a substitute for the App Store as rival iOS app distributors and direct distribution of iOS apps would be, despite Apple’s economic experts having already filed hundreds of pages of reports. To be clear, this uncontroversial point does *not* depend on the premise that consumers and developers *never* (or even rarely) substitute from Apple’s iOS app stores to platforms that do not distribute native iOS apps. Instead, this uncontroversial point depends only on the premise that consumers and developers would substitute from the Apple’s iOS app stores to platforms that do not distribute

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<sup>92</sup> Hitt 2021-03-15 report in Epic v. Apple Exhibit 2.



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native iOS apps *less* than they would substitute to products that do distribute native iOS apps in an unrestrained market.

103. Whereas it should be uncontroversial that two methods of distributing a native iOS app are closer substitutes to each other than are other products that do not distribute native iOS apps, Apple’s experts in the *Epic* litigation have nevertheless argued that the relevant market includes platforms that do not distribute native iOS apps, which necessarily means they believe (incorrectly, as I will explain) that a market limited to native iOS app distribution is not sufficiently broad under the Hypothetical Monopolist test. I disagree with Apple’s experts on this point: below, in Section C, I discuss the evidence indicating that the domestic iOS app distribution market is in fact sufficiently broad under the Hypothetical Monopolist test. This means that relatively more distant substitutes that cannot distribute native iOS apps are not in the same relevant market as Apple’s iOS app stores under standard market definition methodology.

***C. The Hypothetical Monopolist Test Shows That the iOS App Distribution Market is Sufficiently Broad***

104. As discussed above in Section A, a posited market (which is a set of the closest substitutes to the defendant’s product at issue) is sufficiently broad under the Hypothetical Monopolist test if the profit-maximizing price of a hypothetical 100% monopolist in that market was at least 5% higher than the price that would prevail if multiple firms engaged in unrestrained competition in that market (i.e., at least 5% higher than the “competitive price”). Here, that means the iOS app distribution market is sufficiently broad if the profit-maximizing price (i.e., commission) of a 100% monopolist in iOS app distribution would be at least 5% higher than the prices (commissions) that would prevail with unrestrained competition in the domestic iOS app distribution market.

105. Here, we can directly observe the profit-maximizing price of a 100% monopolist in the iOS app distribution market because Apple has had a near-100% share of the iOS app distribution market.<sup>93</sup> Apple’s average commission from the start of the class period (June 4, 2015) to the end of Apple’s transaction data (September 2019) was 28.4%.<sup>94</sup> Thus, the relevant question for the Hypothetical

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<sup>93</sup> See *infra* Part II.A.

<sup>94</sup> “ELOC810 avg commission during class period.txt”. This statistic was calculated using the domestic transaction data Apple produced, which currently ends in September 2019. This



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Monopolist test here is whether 28.4% is at least 5 percent higher than the commission that would have prevailed if the iOS app distribution market had been competitive. The average 28.4% commission that Apple charged in its iOS app stores in the actual world is 5% higher (i.e., 1.05 times higher) than 27.0%. Thus, the relevant question for the Hypothetical Monopolist test here is whether the average commission in the iOS app distribution market would have been less than 27.0% if the market had been competitive.

106. Below I present multiple sources of evidence that indicate Apple’s commissions were far above the competitive level, thus showing that the market is no broader than the market for iOS app and IAP distribution services. First, Apple’s commissions in the actual world, where it is essentially a 100% monopolist in iOS app distribution, are far more than 5% higher than the prices that (i) prevail in more competitive app distribution markets or (ii) would have prevailed in the iOS app distribution market without Apple’s anticompetitive conduct, according to the estimates of other experts. Second, Apple’s extraordinarily high profit margins provide direct evidence that, as a near-100% monopolist, Apple is already exercising a power to raise prices far more than 5% above competitive levels. Third, qualitative evidence also indicates that potential alternatives for app distribution would not constrain a 100% monopolist from profitably raising prices for iOS app distribution significantly above competitive levels. This qualitative evidence includes (among many other things) evidence about: (a) the low percentage of people who own an iOS smartphone and also own an Android smartphone that they could use to run Android apps; (b) the low percentage of iOS device owners who own a Sony PlayStation; and (c) the large share of iOS device owners who do not own a Windows computer and the low percentage of iOS apps that are also available on the leading Windows app distributor, Steam.

107. Even if one disputed my conclusion that the Apple’s actual commissions for iOS app distribution were at least 5% higher than the commission that would have prevailed in a competitive iOS app distribution market, that issue is by definition common to the class. Resolving the issue depends on evidence of average marketwide commissions, rather than the commissions charged to individual class members, and the answer is the same for all class members because it is a fact about the correct amount of that price difference that is equally true or false for all class members.

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statistic is not limited to transactions relating to class members because whether a developer is a class member in this case is not relevant to Apple’s decision about its profit-maximizing commission.

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108. Note importantly that whether the App Store could increase its profits by raising its commissions *another* 5% above *actual* levels is not relevant to determining whether the iOS app distribution market is sufficiently broad under the Hypothetical Monopolist test.<sup>95</sup> Indeed, that would essentially be asking the following pointless question: “would a 100% monopolist’s profits increase if it priced 5% higher than the profit-maximizing price it already charges?” The answer to that question is necessarily “no” because the 100% monopolist’s profit-maximizing price is by definition the price that maximizes the 100% monopolist’s profits. Even if an economist did model the App Store’s profit-maximizing price (with the challenged restraints) and found that it was at least 5% above the actual price that Apple charges, that would imply only that either: (1) either Apple and/or the expert doing the analysis made a mistake when trying to estimate the profit-maximizing price; or (2) Apple is, contrary to economic assumptions, not trying to profit-maximize. Neither of those implications would help establish whether the market was sufficiently broad.

109. Some economists have argued that, when implementing the Hypothetical Monopolist test in a two-sided market, one should allow for the possibility that the hypothetical monopolist would alter the ratio of the prices to the two sides of the market when increasing the total price 5% above the competitive level.<sup>96</sup> Economists describe the ratio of the prices charged to each side of the market as the “price structure,” in contrast to the “price level,” which is the sum of the prices charged to each side of the market.<sup>97</sup> One might thus be concerned that focusing only on the effect of an increase in commissions fails to take into account any effect on fees charged to consumers. But there are two reasons that is not a concern here.

110. First, the evidence shows that neither Apple (a near-100% monopolist in iOS app distribution) nor any of the successful distributors in more competitive benchmarks for app distribution (such as distributors of computer software apps)

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<sup>95</sup> Doing so would commit the well-known cellophane fallacy. See ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 236-37, 256, 271 (3d ed. 2018).

<sup>96</sup> Filistrucchi, Geradin, van Damme & Affeldt, *Market Definition in Two Sided Markets*, 10 J. COMPETITION LAW & ECON. 293, 331-332 (2014) (“while there is consensus in the literature on the fact that one should take into account changes in profits on both sides of the market and all feedback between demands on the two sides, it is by contrast subject to debate whether the hypothetical monopolist should be allowed to optimally adjust the price structure” “(that is, the ratio between the prices paid for a given transaction by the two sides.)”).

<sup>97</sup> *Id.*

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charge consumers any fees to participate in app distribution platforms.<sup>98</sup> This evidence indicates that there is no reason to think that using monopoly power to raise commissions would change the basic pricing structure of charging commissions to developers and no fees to consumers. Instead, this evidence indicates that whatever economic reasons compel this pricing structure apply regardless of the level of competition. Thus, the combined price charged for app distribution to both developers and consumers in a two-sided SSNIP test always simply equals the commission charged to developers.

111. Second, “in two-sided transaction and non-transaction markets, a two-sided SSNIP test that does not allow the hypothetical monopolist to optimally adjust the price structure can... provide evidence on the *upper bound* to the relevant market.”<sup>99</sup> A market defined too broadly would be *conservative* (favorable to Apple) in this case because it would either include too many substitutes to the App Store (and thus reduce Apple’s market share) or identify iOS app distributors as the only platform in the market *despite* a bias toward including other substitutes. Therefore, performing a SSNIP test without price structure adjustments that might alter consumer’s now-zero fee is a defendant-friendly approach that can still yield useful insights about market definition in this case.

*1. Apple’s Commissions Are Far More Than 5% Higher Than Commissions in Competitive Markets*

112. As discussed above, evidence indicating that commissions in the domestic iOS app distribution market would be at least 5% lower if there were competition would indicate that this market passes the Hypothetical Monopolist test. Apple’s average commission in the actual world was 28.4%, which is 5 percent higher than 27.0%. Therefore, evidence of commissions less than 27.0% in more competitive app distribution markets supports the conclusion that the domestic iOS app distribution market is sufficiently broad.

113. As Prof. Economides discusses in his report, the Windows app distribution market is free of the challenged conduct, and consequently is much more competitive than the domestic iOS app distribution market.<sup>100</sup> In the Windows app distribution market, multiple app distributors, such as Steam, the Epic Game Store,

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<sup>98</sup> See *supra* note 60.

<sup>99</sup> Filistrucchi et al., *Market Definition in Two-Sided Markets: Theory and Practice*, 10 J. COMP. L. & ECON. 293, 333 (2014) (emphasis added).

<sup>100</sup> See Economides Opening Class Report Part II.C.1.

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and the Microsoft Store, generate significant commissions from the distribution of other developers apps, and many developers self-distribute their Windows apps.<sup>101</sup> Prof. Economides’ analysis indicates that the weighted average effective commission in the Windows app distribution market is only [REDACTED],<sup>102</sup> which is far less than 27.0%.

114. Using the domestic Windows app distribution market as a yardstick inherently accounts for indirect network effects because that market is also a two-sided transaction platform with indirect network effects. Thus, the commissions that prevail in the Windows app distribution market reflect the commissions that the firms in that market have determined are profit-maximizing, after accounting for the indirect network effects of their platforms.

*2. Apple’s Commissions Are Far More Than 5% Higher Than the Commissions Other Experts Find Would Have Prevailed Without Apple’s Anticompetitive Conduct*

115. Reliable economic models indicating that the average commission in the domestic iOS app distribution market would be at least 5% lower if there were competition in the market would also be sufficient to establish that this market is sufficiently broad.

116. Prof. Economides, who was also retained by Developer Plaintiffs in this matter, presents an economic model indicating that the average commission rate in the iOS app distribution market in the but-for world would have been 13.0-14.8%. Apple’s average commission rate in the domestic iOS app distribution market in the actual world, where Apple is a near-100% monopolist, is 28.4%, which is 92% (i.e. 1.92 times) higher than Prof. Economides’ upper-bound estimate of the competitive commission rate, and therefore supports the conclusion that the iOS app distribution market is sufficiently broad.

117. Similarly, Prof. Evans, who was retained by Epic Games in its related litigation against Apple, estimated that the App Store’s average commission rate in

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<sup>101</sup> See Economides Opening Class Report Table 4 (Valve, Epic, EA, Blizzard, and TenCent all self-distribute their own Windows apps).

<sup>102</sup> Economides Opening Class Report Table 4.

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a competitive but-for world would have been 14.9%.<sup>103</sup> Apple’s actual average commission is 28.4%, which is 91% higher than the competitive price level estimated by Prof. Evans. Thus far, Apple’s retained economic experts have critiqued Prof. Evans’ estimate of the App Store’s average but-for commission, but have not put forth any estimates of Apple’s but-for commission that they believe are reliable.<sup>104</sup>

118. Prof. Economides and Prof. Evans’ models inherently account for indirect network effects because the comparator firms on which these models are based are also two-sided platforms with indirect network effects.<sup>105</sup>

119. Thus, the App Store’s actual average commission of 28.4% is far more than 5% higher than the commission that would have prevailed in the domestic iOS app distribution market if it were competitive, according to the economic models of both Prof. Economides and Prof. Evans. Thus, a conclusion that either of their models was reliable would be independently sufficient to establish that the domestic iOS app distribution was sufficiently broad under the Hypothetical Monopolist test.

*3. Direct Evidence of Apple’s Power to Raise Prices Significantly Higher Than Competitive Levels Also Confirms That the Hypothetical Monopolist Test Is Met*

120. There is also copious other evidence that Apple has the power to raise prices enormously higher than competitive levels. Apple’s Lerner Index for its App Store, a short-term profit margin based on marginal costs, was an eye-popping 92% in 2019 and 2020.<sup>106</sup> This is far above not only the 10% that prevails in highly competitive markets, but also the 40-50% that could prevail in reasonably

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<sup>103</sup> Evans 2021-02-16 Expert Report in Epic v. Apple ¶734 (“I showed earlier that with more competition, the commission would be 14.9 percent, under plausible assumptions, compared to the 26.4 percent effective rate under monopoly conditions.”); *id.* ¶¶591-597 (describing underlying premises and methodology for his 14.9 percent but-for commission estimate). Prof. Evans calculation of a 26.4% effective Apple commission rate varies from my calculations of Apple’s average commission rate because, while I relied on the actual transactional data, Prof. Evans relied on summary financial *forecasts*. See Evans 2021-02-16 report ¶458, n. 662.

<sup>104</sup> Prof. Lafontaine has the most extensive critique of Prof. Evans’ but-for commission estimate. 2021-03-15 Rebuttal Report in Epic v. Apple ¶246. Prof. Hitt endorses Prof. Lafontaine’s critique, but does not appear to add to it. Hitt 2021-03-15 Rebuttal Report in Epic v. Apple, ¶421.

<sup>105</sup> See Economides Opening Class Report ¶42. The comparator firms included in Prof. Economides’ model are eBay, Rakuten, Alibaba, MercadoLibre, and Etsy. *Id.* ¶43.

<sup>106</sup> See *infra* Part II.D.2.a,



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competitive markets.<sup>107</sup> This provides strong direct evidence that, as not only a hypothetical but actual near-100% monopolist, Apple has been able to raise prices for iOS app and IAP distribution services way more than 5% above competitive levels, thus satisfying the test for market definition.

121. Even if one included recurring fixed costs to calculate Apple’s long-run profit margin, its profit margin for its App Store averaged █████ from 2018-2020.<sup>108</sup> This again indicates a power to price far more than 5% higher than normal competitive levels, even if one uses as a benchmark the possible reasonably competitive profit margin of 40-50%, which considers only marginal costs. Further, Apple’s profit margin for its App Store also exceeded by far more than 5% the profit margins for Google’s Play Store, which itself has considerable market power,<sup>109</sup> which again indicates a power to price far more than 5% above competitive levels.

*4. Qualitative Evidence Also Establishes that the Domestic iOS App Distribution Market Passes the Hypothetical Monopolist Test*

122. Market definition analysis under the hypothetical monopolist test does not focus exclusively on quantitative evidence; qualitative evidence can bear on these factors.<sup>110</sup> In fact, the Horizontal Merger Guidelines state that “Even when the evidence necessary to perform the hypothetical monopolist test quantitatively is not available, the conceptual framework of the test provides a useful methodological tool for gathering and analyzing evidence pertinent to customer substitution and to market definition.”<sup>111</sup> Apple’s experts in *Epic v. Apple*, in attempting to affirmatively define an antitrust market for game transactions on digital platforms,

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<sup>107</sup> *Id.*

<sup>108</sup> *Id.*

<sup>109</sup> *Id.*; *infra* Part II.D.2.c.

<sup>110</sup> American Bar Association, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.C.1.a. (2012) (“qualitative information or experience can be used to argue that the price elasticity of a particular product is unlikely to be beyond the critical threshold or that a loss is unlikely to be larger or smaller than the critical level”); *id.* at III.B.1.a. (“As in all merger cases, market definition in consumer products cases generally begins with reviewing qualitative information”); *id.* at VIII.B.2.d.(1) (“To test whether two Pharmaceuticals are reasonably interchangeable, economists do not focus solely on whether the products treat the same illness. They also measure (either quantitatively or qualitatively) the own price-elasticity of demand for one or both products and/or the cross-elasticity of demand between the products at issue to assess whether the products are sufficiently close substitutes that one product constrains the pricing of the other product.”).

<sup>111</sup> DOJ/FTC HORIZONTAL MERGER GUIDELINES §4.1.3.

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rely extensively on qualitative evidence (though I will explain below that their interpretation of some of that evidence is selective and flawed).<sup>112</sup>

123. There are many different types of qualitative evidence that economists use to implement the hypothetical monopolist test.<sup>113</sup> Qualitative evidence is relevant to the hypothetical monopolist test to the extent it indicates how likely customers are to substitute to products outside of the posited market if the price within the posited market increased significantly above the competitive level. In particular, qualitative evidence that customers are less likely to substitute to alternatives outside of the market supports the conclusion that the relevant market is sufficiently broad.

124. Apple claims in response to an RFI from the House Committee on the Judiciary that “Consumers have many alternatives to the App Store for consuming apps, and developers can take advantage of the many different distribution outlets available to distribute their apps.”<sup>114</sup> Apple has—in response to this RFI, in various legal filings,<sup>115</sup> in a presentation to the DOJ,<sup>116</sup> and in various expert and economist reports in *Epic v. Apple*—listed a large set of “alternatives” that Apple claims prevent Apple from having power in any market due to “fierce” and “aggressive” competition. Broadly speaking, these fall into three categories: (a) posited substitutes that involve use of an iOS device; (b) posited substitutes that involve use of a non-iOS mobile device (smartphone or tablet); and (c) posited substitutes that involve the use of a device other than a mobile device. Although my findings in Sections C.1-3 above are sufficient to show that a market for iOS app distribution is properly defined and thus excludes all of these posited substitutes, I nonetheless discuss the qualitative evidence on each of them, both as an independent showing of non-substitutability and as a corroboration of those earlier findings.

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<sup>112</sup> For example, Professor Hitt’s Rebuttal Report has an entire section titled “Dr. Evans ignores qualitative evidence demonstrating that the App Store competes with other game transaction platforms”. Hitt 2021-03-15 Rebuttal Report in *Epic v. Apple* ¶225.

<sup>113</sup> DOJ/FTC Horizontal Merger Guidelines §4.13 (2010)

<sup>114</sup> APL-APPSTORE\_07093536. Although this document alone doesn’t specifically indicate it is a response to an RFI from the House Committee on the Judiciary, it is responding to a question that is numbered and worded exactly like the September 13, 2019 RFI issued to Apple by the House Committee on the Judiciary. See September 13, 2019 letter from the House Committee on the Judiciary to Apple, available at <https://judiciary.house.gov/sites/democrats.judiciary.house.gov/files/documents/apple%20rfi%20-%20signed.pdf> (accessed 5/28/2021).

<sup>115</sup> Defendant Apple Inc.’s Answer to Plaintiffs’ Consolidated Class Action Complaint, Dkt. No. 74.

<sup>116</sup> APL-APPSTORE\_07093941.

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a. The Posited Substitutes on iOS Devices Are Not Reasonable Substitutes

125. The substitutes that Apple and its experts have posited related to iOS devices are (i) Browser and Web Apps, (ii) Reader and Multiplatform Content, (iii) Game Streaming, and (iv) Apple Arcade.

126. *i. Web Apps.* A web app is “a webpage that is accessible through the browser like a regular webpage, for example, by typing a URL in the mobile browser or through a query in an online search engine. The difference with a regular webpage is that web-apps offer extended functionality compared with a regular webpage such as opportunities for interactions, partially working offline, and push notifications (Android only). Also, web-apps are more optimized for mobile than regular webpages are. For example, they have shorter loading times than regular webpages.”<sup>117</sup>

127. The qualitative evidence set forth below indicates why web app distribution would not sufficiently shift demand for native iOS app distribution based on functional differences. I do not claim that web app distribution can never serve as a substitute for a native app. Nor do I claim that no developers or users substitute between web app distribution and iOS app distribution. Rather, I explain that the qualitative evidence supports a finding that any such substitution is *insufficient* to reject defining an iOS app distribution market under the hypothetical monopolist test, which is the relevant inquiry.

128. First, transacting for or within a web app results in an inferior user experience compared to transacting for a native app, because web apps themselves are inferior in nature. The Netherlands ACM notes that

content accessible through a regular webpage differs so much from a native app that it cannot be considered an alternative to a native app. The main reason is that an app is a software program that has access to the hardware of the device it runs on, and thus ads extra functionality. The browser is a way of offering static content, but by no means an option to offer a software program. This also follows from article 4.2 from Apple’s App Store Review Guidelines about minimum functionality: *Your app should include features, content, and UI that elevate it beyond a repackaged website. If your app is not particularly useful, unique, or “app-like,” it doesn’t belong on the App Store.* So a

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<sup>117</sup> Netherlands ACM, *Market study into mobile app stores*, Case no. ACM/18/032693, 42 (April 11, 2019) (hereinafter “ACM, *Market study into mobile app stores*”).

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native app that offers similar functionality as a webpage would not be allowed in the App Store, as Apple also confirms: *Apps need to add real value and not just copy basic content in an app (like a restaurant app which has only the menu in the app) or offer something that looks like an ordinary website. If what the app offers is also possible within a browser, then it doesn’t belong in the App Store. A web-app can simulate a native app, but a native app shouldn’t only simulate a web-app or browser.*<sup>118</sup>

On iOS, web apps are limited in the functionality they can offer: for example, as of iOS 12, they did not have access to push notifications, Bluetooth, battery information, or background location, and Apple also did not allow iOS web apps to use more than 50MB of storage on the iOS device.<sup>119</sup> Moreover, as just quoted, Apple itself states that if “what [an] app offers is also possible within a browser, then it doesn’t belong in the App Store”; that statement makes clear that *Apple itself is saying the two things are not equivalent*, so that developers cannot usually substitute from transacting through the App Store to transacting through a web app or web app platform.

129. Second, I also explained above in Section B.3.b how consumers are generally made far less likely to substitute between different versions of the same app from different app distributors because app distributors generally use “anti-steering” or “anti-circumvention” rules to prevent developers from steering consumers towards alternative methods of selling digital products. This statement is equally applicable to developers attempting to shift consumers from native app transactions to web app transactions.

130. *ii. Reader and Multiplatform Content.* Apple’s experts claim that iOS apps are allowed to access content within the iOS app that was purchased outside of the iOS app, such as when a Kindle ebook is bought on Amazon and the buyer then downloads that book to her iOS Kindle app, providing a mechanism for iOS developers to make sales outside of the iOS app (and thus free of Apple’s commission).<sup>120</sup> There are at least three reasons why such alternatives are not a reasonable substitute for iOS app distribution (which occurs on the iOS device itself). First, the reader and multiplatform exceptions apply only to accessing

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<sup>118</sup> ACM, *Market study into mobile app stores* at 42 (emphasis in original).

<sup>119</sup> <https://medium.com/@firt/progressive-web-apps-on-ios-are-here-d00430dee3a7>

<sup>120</sup> Hitt 2021-03-15 Rebuttal Report in *Epic v. Apple* ¶221 (“When ‘reader’ apps choose to have consumers make paid transactions off the App Store for iOS content, those developers and consumers are substituting for paid transactions on the App Store.”).

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content within an app that was purchased outside the app, and thus those exceptions provide no alternative option to users for initial app distribution. Second, Apple implements anti-steering rules that restrict the ability of developers to encourage users to seek purchases in alternate channels.<sup>121</sup> Regardless of whether one believes Apple is justified in doing so, the simple fact is that Apple is purposefully constraining the exact type of substitution its experts purport to consider a competitive constraint. Third, I explain below in Section C.4.b that users have a specific demand for *mobile* consumption, because they use these devices in situations demanding portability. Suppose a user is enjoying their iPhone or iPad on a bus, on a plane, at a hotel, in the bathroom, etc. etc.— a user in this situation and faced with a desire to make an in-app purchase on whatever app they are using would clearly be unable to or inconvenienced by an attempt to make the purchase outside the app.

131. To be sure, I do not suggest that iOS users never purchase content on one platform and then eventually happen to consume that content from within an iOS app. But that does not reflect *substitution* between transacting on other platforms and transacting from within iOS apps based on changes in relative prices. Instead, it merely reflects consumers purchasing content they are interested in on whatever platform is most convenient for them at the moment they decide to purchase it. Further, the qualitative differences between iOS apps and other alternatives (discussed above) create information and convenience barriers that hinder *substitution* between iOS apps and alternatives in response to relative price changes. And because of Apple’s anti-steering rules, consumers often will not even know if they could purchase the same content for a lower price outside an iOS app. My implementation of the Hypothetical Monopolist test directly shows that such potential alternatives fail to constrain Apple’s pricing.

132. *iii. Game Streaming.* When a consumer “streams” a game, the local device they are physically interacting with (such as a smartphone or laptop) does not actually store the game’s data in its local memory or perform any of the complex calculations necessary to run the game (such as simulating the physics within the virtual world, simulating enemy artificial intelligence, or determining how the lighting on objects in the virtual world should change in response to the movement of objects that emit or reflect light). Instead, the local device only registers user input (e.g. where and when the user touched the screen) and sends data about that user input over the Internet to the cloud gaming provider’s remote computer servers. The cloud gaming provider’s remote computer servers actually run the game (and

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<sup>121</sup> See *supra* Section B.3.b.



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thus perform all the difficult computations just described) and stream a video of the game back over the Internet to the user’s local device. Consequently, steaming a game is possible only with an internet connection. In contrast, a normal (non-streaming) native app on an iOS device can run even without an internet connection because all computations occur within the iOS device. Further, if the user’s internet connection does not have sufficiently high bandwidth, the video streamed from a “cloud gaming” provider’s servers will be pixelated and low quality. And if the user’s internet connection is not sufficiently low-latency, the user of a game streaming app will experience a “lag” between physically making an input on their local device and seeing the result of that input in the virtual world. These limitations of game streaming apps are inherent to their design, and therefore apply to all of the game streaming services discussed below. Although Apple Expert Professor Schmalensee admits that “cloud-based streaming services platforms are still in their infancy”, he nevertheless asserts that they “have only recently become a meaningful alternative to traditional gaming”.<sup>122</sup> There is no dispute that such streaming services were *not* even distant substitutes for iOS app distribution until whatever point Professor Schmalensee considers to be “recently”. Further, I do not agree with Professor Schmalensee that they have since becoming meaningful substitutes. Professor Schmalensee lists five examples of cloud-based streamlining services,<sup>123</sup> but none were reasonable substitutes for iOS app distribution during the class period and thus they could not have affected market definition during that period:

- Professor Schmalensee acknowledges that Google Stadia did not launch until November 2019.<sup>124</sup> Further, he omits that it was only made available to iOS devices in December 2020.<sup>125</sup> Moreover, Stadia’s website states that “Support for Stadia on iOS is a feature still in development. Some Stadia features may not be available on iOS, or may not function properly.”<sup>126</sup>

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<sup>122</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>123</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>124</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>125</sup> <https://www.ign.com/articles/google-stadia-ios-now-available>

<sup>126</sup> <https://support.google.com/stadia/answer/10204874?hl=en>. See also Sean Hollister, *Google Stadia Review: The Best of Cloud Gaming is Still Just a Beta* (published November 18, 2019, available at <https://www.theverge.com/2019/11/18/20970297/google-stadia-review-gaming-streaming-cloud-price-specs-features-chrome-pixel>) (“Google’s cloud gaming service isn’t anywhere near what the company initially promised in March. It’s effectively a beta that Google is charging real money for.” The article lists disadvantages such as “Gobs of features missing at launch” and “Doesn’t work over LTE” (i.e., over a mobile internet connection)); Joanna Nelius, *Thinking about buying Stadia, Here’s what you need* (available at <https://www.pcgamer.com/google-stadia-hardware-requirements/>) (“While Google Stadia says it works with a minimum connection speed of 10 Mbps, we wouldn’t recommend that experience to

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- Professor Schmalensee acknowledges that Nvidia GeForce Now did not launch until February 2020.<sup>127</sup> However, he omits that it was only made available in beta on iOS in November 2020.<sup>128</sup>
- Professor Schmalensee notes that “Sony PlayStation Now” has been available since 2014.<sup>129</sup> However, he cites no evidence (and I am aware of none) that this service is available on iOS.
- Professor Schmalensee observes that Microsoft Cloud “is coming to iOS in 2021”.<sup>130</sup> It thus has not even happened yet, and thus could not possibly be a substitute that affected market definition during the class period. Further, my understanding is that it is still in a beta stage for iOS devices.<sup>131</sup>
- Professor Schmalensee acknowledges that Amazon Luna did not launch until in October 2020 and is “early access” and thus invitation-only.<sup>132</sup>

Accordingly, Professor Schmalensee does not actually give an example of a game streaming service that has been available on iOS for more than 7 months, and he also does not give *any* example of a game streaming service available on iOS that is not still in development. Prof. Hitt is thus mistaken to claim that this information justifies a conclusion that services “such as Google Stadia, are two-sided digital game transaction platforms that compete directly with the App Store.”<sup>133</sup>

133. In short, the claim that game streaming services serve as a meaningful substitute for app distribution on an iOS device is undermined not only by the qualitative differences between game streaming services and playing a normal, non-streaming native game, but also by the fact that no such services have fully launched and even those that have beta launched have not been around for more than 7 months. Thus, I see no information from which defense experts could have reasonably concluded that game streaming services have constrained App Store pricing during the class period.

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anyone. You'll be limited to a fuzzy 720p picture, if it works at all.”); Andrew McDonald, *Google Stadia Revisited – Is It Any Better?* (published August 17, 2020, available at <https://techteamgb.co.uk/2020/08/17/google-stadia-revisited-is-it-any-better/>) (Google Stadia is “just as slow as when it launched. ... [Google Stadia] took 152ms to register a response. That’s really, really slow.”).

<sup>127</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>128</sup> <https://blogs.nvidia.com/blog/2020/11/19/geforce-now-on-ios-safari/>

<sup>129</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>130</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>131</sup> <https://9to5mac.com/2021/04/19/microsoft-xcloud-public-beta-ios-available/>

<sup>132</sup> Schmalensee 2021-02-16 report in Epic v. Apple ¶34.

<sup>133</sup> Hitt 2021-03-15 Rebuttal Report in Epic v. Apple ¶74.

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134. *iv. Apple Arcade.* Apple Arcade is a subscription-based service offered by Apple to users, in which a user pays a monthly fee in return for access to a library of games curated by Apple and delivered through the App Store.<sup>134</sup> I am not aware of any argument by Apple’s experts that Apple Arcade constrains the pricing of Apple’s App Store. Indeed, it is hard to see how it could because Apple itself runs Apple Arcade and thus presumably controls its pricing and commissions, and Apple hardly has incentives to constrain its own pricing power. It is also my understanding that Apple Arcade developers must be invited to participate in Arcade; it is not the case that any developer (or any game developer) can choose to join Arcade.<sup>135</sup> Arcade had 180 games as of April 2021, compared to the over 1 million apps on the App Store.<sup>136</sup> Because developers cannot actually choose to substitute from the App Store to Apple Arcade, because Arcade constitutes a miniscule portion of app selection compared to the App Store, and because Apple itself runs the Apple Arcade, there is no reason to believe Apple Arcade constrains App Store pricing.

b. Posited Substitutes on Non-iOS Mobile Devices (Tablets and Smartphones)

135. As I have noted previously, but stress again here due to its particular relevance to Apple’s argument that Google Play is part of the relevant market, the economic literature advises that in a two-sided transaction market, candidate substitute products must “offer, **to both sides**, the possibility to transact”.<sup>137</sup> Apple’s own expert in *Epic v. Apple*, Prof. Schmalensee, agrees with this theoretical point, stating, “As a matter of economics, two-sided platforms face competition from other similarly situated two-sided platforms that facilitate **transactions between the same two sets of users.**”<sup>138</sup> Thus, if one is evaluating app distribution for a non-iOS

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<sup>134</sup> <https://www.apple.com/newsroom/2019/03/apple-introduces-apple-arcade-the-worlds-first-game-subscription-service-for-mobile-desktop-and-the-living-room/>

<sup>135</sup> See <https://www.idropnews.com/news/its-a-big-day-for-apple-arcade/155635/> (“development for Apple Arcade is a “by-invite-only” process, since Apple wants to make sure the games meet its standards.”); <https://www.apple.com/newsroom/2019/03/apple-introduces-apple-arcade-the-worlds-first-game-subscription-service-for-mobile-desktop-and-the-living-room/> (stating Arcade is a “handpicked collection” of titles).

<sup>136</sup> Statista, *Number of apps available in leading app stores as of 1<sup>st</sup> quarter 2021* (available at <https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>).

<sup>137</sup> Filistrucchi et al., *Market Definition in Two-Sided Markets: Theory and Practice*, 10 J. COMP. L. & ECON. 293, 303 (2014) (emphasis added); Filistrucchi, *Market definition in multi-sided markets*, OECD Rethinking Antitrust Tools for Multi-Sided Platforms, 42 (2018) (“a two-sided transaction market candidate substitute products constraining the ability of the two-sided transaction platform to raise prices are not only other platforms, which offer, to both sides, the possibility to transact but also non-intermediated transactions.”).

<sup>138</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶90 (emphasis added).

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device as a potential substitute, that means the first question one should answer is whether *the same developers* can transact with *the same iOS users* on Android, and whether the iOS transactions themselves will actually be shifted to Android in response to price increases over a competitive level in iOS app distribution.

136. For the simple reason that the vast majority of iOS device users do not also own a parallel Android device,<sup>139</sup> developers cannot reach those same iOS users on Android. In an expert report concerning the launch of Apple Pay in Australia, Professor Athey notes that “if an application developer chooses not to sell through the Apple App Store... it recognizes that it will simply lose access to those consumers, rather than... induce the consumers to follow the application to the Android platform.”<sup>140</sup> Professor Athey notes two reasons for this. First, there is a significant time lag in consumers changing smartphones; consumers cannot instantly switch platforms due to high switching costs.<sup>141</sup> Second, the availability of substitute apps on the iOS platform limits the ability of any particular application to induce customers to switch to another platform.<sup>142</sup>

137. Apple’s experts in *Epic v. Apple* make voluminous arguments about developers who developed apps for, and had transactions on, both iOS and Android.<sup>143</sup> Yet the question of whether developers *happen* to patronize both platforms is not in and of itself probative of whether developers *substitute* between the two platforms based on price. The relevant question is whether developers choose to participate in the Apple App Store to reach a specific set of iOS users that they would have difficulty reaching otherwise. The evidence I describe in the preceding paragraph indicates that is the case. Moreover, even in situations where an iOS device user also owns a parallel Android device and a developer has an app available on both platforms, the question is still whether the developer and user would substitute iOS app transactions for Android app transactions in response to price changes, rather than the two sets of transactions simply being distinct sets of

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<sup>139</sup> See *supra* notes 52 and 53, where I show that 98% of iPhone owners do not own an Android smartphone and over 78% do not own an Android-based tablet.

<sup>140</sup> Susan Athey, *White Paper – Apple Pay In Australia*, at 12.

<sup>141</sup> *Id.* at 12; *infra* Part II, Section E.3.

<sup>142</sup> Susan Athey, *White Paper – Apple Pay In Australia*, at 13.

<sup>143</sup> See Hitt 2021-03-15 Rebuttal Report in *Epic v. Apple* ¶216 (“consumers and developers can substitute game transactions through other game transaction platforms by both transacting and playing in non-iOS apps on non-iOS devices. Additionally, the fact that a given consumer may make game transactions both through the App Store and through another platform does not stop those transactions from being substitutes any more than a consumer buying both a Honda and a Toyota stops them from being substitutes.”).

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preferences by the user (e.g., a work Android phone and a personal iOS phone, with games purchased only on the iOS phone). I have not found any analysis by Apple or its experts that provides persuasive evidence on the relevant questions.

138. My conclusion that Android app distribution fails to constrain Apple pricing for iOS app distribution is corroborated by the findings of various competition authorities around the globe. The Netherlands Authority for Consumers and Market (ACM) believes: “[i]f they [app developers] offer their app only for a single app-ecosystem, they miss out on a very important part of their potential audience. In fact, they miss out on a whole market since Android users are different from iOS users, they could be viewed as separate markets.”<sup>144</sup> The European Commission has similarly expressed that Google Play is an entirely separate market to iOS distribution, stating “Google’s app store dominance is not constrained by Apple’s App Store, which is only available on iOS devices”.<sup>145</sup> The premise of these findings is that there is low demand shifting across the two platforms, because they involve fairly distinct sets of users.

c. Posited Substitutes on Non-Mobile Devices

139. As just noted in the preceding section, the relevant issue is whether transactions between iOS developers and iOS users on the App Store can be substituted with transactions between those same developers and users outside the App Store. One of Apple’s experts, Prof. Hitt, has argued that the relevant market also includes video game consoles and desktop computers, which can run similar versions of some iOS apps (and the game Fortnite in particular), because “consumers are able to play Fortnite on [those other] platforms”,<sup>146</sup> but such a statement sheds no light on whether iOS users actually substitute Fortnite playing activity among the platforms based on price (which is the relevant question that Apple’s experts ignore). To illustrate, suppose hypothetically that a consumer owns a home PC and an iOS device. This consumer spends an hour each day on the bus going to and from work, playing games on her iPhone, and has an hour of leisure time at home each evening, playing different games—more resource-intensive, graphics-driven games—on her PC. This hypothetical consumer *literally cannot* substitute game distribution on iOS for game distribution on PC. Yet Apple’s experts in *Epic v. Apple* generally base

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<sup>144</sup> ACM, *Market study into mobile app stores* at 42 (emphasis added).

<sup>145</sup> [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_18\\_4581](https://ec.europa.eu/commission/presscorner/detail/en/IP_18_4581)

<sup>146</sup> Hitt Decl. Sept. 15, 2020 ISO Apple’s Opp. to Epic’s Motion for Prelim. Inj. ¶14; *id.* ¶42 (“The question is not whether Epic can convince consumers to switch their smartphone from an iPhone to an Android, but whether Epic can convince consumers to play Fortnite on any platform other than iOS”)



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their arguments about market definition on statistics that are *incapable* of distinguishing situations akin to this hypothetical from situations where the distribution on iOS may actually face some actual or potential demand shifting from other platforms.<sup>147</sup>

140. More generally, for mobile device users, the app marketplaces of video game consoles and desktop/laptop computers are not close substitutes for Apple’s iOS app store for three main reasons. First, many of the apps on Apple’s App Store do not have versions that are available on video game consoles or app distributors for desktop/laptop computers.<sup>148</sup> Second, even for iOS apps with versions that work on video game consoles or on a computer with a different operating system, many iOS device owners do not own video game consoles or a computer with the relevant operating system. According to Apple Expert Professor Hitt, only 21-30% of iPhone owners own any gaming console,<sup>149</sup> and thus 70-79% of them clearly could not switch to apps on gaming consoles. If the same iOS app is only available on macOS, then substitution will be limited by the fact that Professor Hitt also finds that only 29-44% of iPhone users have a Mac computer.<sup>150</sup> Third, even for people who own video game consoles and/or desktop/laptop computers, their bulky size and lack of portability makes them poor substitutes for smartphones. Even the Nintendo Switch, which is the smallest, most portable video game console that Prof. Hitt claims is also in the market, is significantly larger than any of the iPhones Apple sells, and consequently they do not fit easily in pockets or purses the way smartphones do.<sup>151</sup>

141. A conclusion that apps on bulky less-portable devices like game consoles and computers are not substitutes for apps on mobile devices is supported by copious evidence that iOS users demand mobile transactions on their mobile devices, regardless of whether they may also happen to patronize certain types of non-mobile transactions on non-iOS devices. For example, there is a concept of

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<sup>147</sup> For example, Professor Hitt states that “Among both game apps and apps in general, a significant share of them are also available on additional types of alternative devices (e.g., consoles)”, Hitt 2021-03-15 Rebuttal Report in Epic v. Apple ¶140, but this *availability* says nothing about whether the apps are demanded in ways that *shift* transactions among the devices.

<sup>148</sup> See *supra* note 67 (explaining why iOS apps often do not have equivalent versions on video game consoles); note 70 (analysis of how often iOS apps have versions available on Steam).

<sup>149</sup> See Hitt 2021-02-16 Opening Report in Epic v. Apple ¶81.

<sup>150</sup> *Id.*

<sup>151</sup> Nintendo Switch technical specification, available at [www.nintendo.com/switch/tech-specs/](http://www.nintendo.com/switch/tech-specs/) (“Size: Approximately 4 inches high, 9.4 inches long, and 0.55 inches deep (with Joy-Con attached)\*The depth from the tip of the analog sticks to the tip of the ZL/ZR buttons is 1.12 inches”). Apple’s largest iPhone, the iPhone 11 Pro Max, is 6.22” tall, 3.06” wide, and 0.32” deep. [www.apple.com/iphone/compare/](http://www.apple.com/iphone/compare/).

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“micro-leisure” where users seek to engage with their mobile devices for minutes of downtime during the day.<sup>152</sup> [REDACTED]

[REDACTED]<sup>153</sup> App Annie’s 2020 “State of Mobile” report states that mobile devices capture 3 hours and 40 minutes of user attention each day.<sup>154</sup> An internal March 2019 Apple email relays that [REDACTED]

[REDACTED]<sup>155</sup> Tim Cook himself testified, when asked why people use the iPhone to watch video content like Hulu when they also have TVs, that Hulu can be used “while you’re on the go. You can watch it while you’re standing in line at Starbucks waiting for your coffee. It can be something that you point out to somebody, you just want to show an episode and you’re with them. So there are I think a ton of reasons. Maybe you’re commuting and you’re commuting on a train and you watch a show, so lots of different reasons. Those are just some.”<sup>156</sup> He similarly testified on why users play games on the iPhone: “maybe you’re out and about. Maybe you’re playing with friends over at the house. Maybe you’re at school.”<sup>157</sup>

142. The preceding paragraph establishes that iOS users have a demand for *mobile* consumption through their mobile devices. The relevant question is therefore whether *App Store* transactions underlying that consumption can be substituted with *non-App-Store* transactions on non-mobile devices for that consumption. Whether these users happen to also use non-mobile platforms in other situations is not determinative of whether there is sufficient substitutability between these two types of transactions—on either the user or the developer side—to constrain pricing in iOS app distribution.

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<sup>152</sup> “MRY have coined the phrase micro-leisure to describe how certain generations, such as millennial’s, are now taking micro-moments on their smart devices to create free time. In fact nearly 87% of people from this group, born between 1980-2000, state that their smartphone never leaves their sides. This leaves it possible for them to take those micro moments during the day, in the region of around 17 minutes for every 52 minutes that they work.” <https://www.kamagames.com/news/increase-in-micro-leisure-time>

<sup>153</sup> APL-APPSTORE\_06719044 at 46.

<sup>154</sup> <https://www.appannie.com/en/go/state-of-mobile-2020/>

<sup>155</sup> APL-APPSTORE\_09659460

<sup>156</sup> Tim Cook 2/12/21 Dep. at 255:5-18.

<sup>157</sup> Tim Cook 2/12/21 Dep. at 256:20-257:2.

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143. Prof. Hitt also does not explicitly opine on whether the app marketplaces for video game consoles and desktop/laptop computers are closer substitutes to Apple’s app store than app marketplaces for other mobile device operating systems. In contrast, three other economists retained by Apple have concluded that video game console marketplaces *are* more distant substitutes to the App Store than app stores for other mobile device operating systems.<sup>158</sup> Thus, unless another expert opines otherwise, it appears to be undisputed that app marketplaces for video game consoles and desktop/laptop computers are more distant (and therefore weaker) substitutes than the app marketplaces of other mobile device operating systems.

***D. My Conclusions Do Not Depend on Whether There Are Separate Markets for iOS App Distribution and Digital IAP Mechanisms***

144. The analysis above establishes that the relevant product market is no broader than iOS app and digital in-app-purchase (IAP) distribution services. In the *Epic* litigation, Epic’s expert Professor Evans took the position that market was narrower because there are separate markets for iOS app distribution and digital IAP mechanisms, and thus that Apple was tying together two products by requiring developers who distributed their apps via Apple’s iOS app stores to use Apple’s IAP mechanism when they sold digital products within their apps.<sup>159</sup> In contrast, Apple’s expert Professor Schmalensee took the position that iOS app distribution and digital IAP mechanisms were part of a single market.<sup>160</sup>

145. I do not take a position on this issue for two reasons. First, the evidence is mixed on whether iOS app distribution and digital IAP mechanisms are separate markets or not. Second, whether or not they are separate markets does not affect any of my conclusions.

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<sup>158</sup> Borck, Caminade, Wartburg, *Apple’s App Store and Other Digital Marketplaces* (July 22, 2020) (“Our review included four types of digital marketplaces, grouped by their business model and ordered according to their similarity with Apple’s App Store: (1) other app stores and software distribution platforms, (2) video game digital marketplaces, (3) marketplaces that distribute digital content, and (4) e-commerce (that sell physical goods and services.”).

<sup>159</sup> Evans 2021-02-16 report in *Epic v. Apple* Part I.C.4.s

<sup>160</sup> Schmalensee 2021-03-15 report in *Epic v. Apple* ¶¶ 210-307.



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146. Professor Evans stresses that firms often do not bundle initial app distribution with IAPs mechanisms.<sup>161</sup> However, all of Professor Evans’s examples involve *non-digital* IAPs,<sup>162</sup> and many app distributors other than Apple require that any apps they distribute use that distributor’s IAP mechanism for digital products bought within those apps. This includes some app distributors that may have large amounts of market power. For example, the Google Play Store, the dominant Android app distributor, requires developers to use Google’s IAP mechanism when they sell digital products within apps distributed by the Google Play Store.<sup>163</sup> Similarly, Steam, the most successful Windows app distributor,<sup>164</sup> requires the use of its own IAP mechanism when developers sell digital products within the apps Steam distributes.<sup>165</sup> However, this also includes some large app distributors that are in more competitive markets whose market power (if any) is more limited. For example, Samsung Galaxy Store has less than a 5% share of the Android app distribution market outside of China,<sup>166</sup> and it requires developers to use Samsung’s IAP mechanism when they sell digital products within apps distributed by the Samsung Galaxy Store.<sup>167</sup> The Amazon App Store also has less than a 5% share of

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<sup>161</sup> See Evans 2021-02-16 report in *Epic v. Apple* ¶812 (“The App Store and Google Play do not require that apps that sell physical goods, such as eCommerce apps that sell physical goods, and services that are provided physically, such as ride sharing, use a payment method provided by the store for those transactions.”)

<sup>162</sup> *Id.*

<sup>163</sup> Google Play Console Help, Payments (available at [support.google.com/googleplay/android-developer/answer/9858738](https://support.google.com/googleplay/android-developer/answer/9858738)) (“Developers charging for apps and downloads from Google Play must use Google Play’s billing system as the method of payment. Play-distributed apps must use Google Play’s billing system as the method of payment if they require or accept payment or access to features or services, including any app functionality, digital content, or goods.”).

<sup>164</sup> At this point, I do not yet have an opinion on the extent of Steam’s market power, but I cannot yet rule out the possibility that Steam has significant market power.

<sup>165</sup> Steamworks Documentation, *Microtransactions (In-Game Purchases)*, (available at <https://partner.steamgames.com/doc/features/microtransactions>) (“For any in-game purchases, you’ll need to use the microtransaction API so Steam customers can only make purchases from the Steam Wallet.”).

<sup>166</sup> See July 18, 2018 European Commission Decision in Case AT.40099 (Google Android), at Table 5 (the commission decision redacted Samsung’s exact share, instead reporting the Galaxy Store’s share as “0-5%”).

<sup>167</sup> Samsung, App Distribution Guide (available at <https://developer.samsung.com/galaxy-store/distribution-guide.html>) § 1.1.10 (“Samsung IAP must be used to sell in app products (such as items and subscription). If you use other payment system in your app, the app may not be confirmed during the review process or be suspended if it’s already on sale.”).

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<sup>170</sup> MSFT EPIC 00000348 (2018 internal Microsoft presentation stating that

<sup>173</sup> See, e.g. EPIC\_00023592 at EPIC\_00023594 (September 2019 distribution agreement between the Epic Games Store and the developer [REDACTED]).

See, e.g., EPIC\_00023559 at EPIC 00023560 (June 2020 distribution agreement between the Epic Games Store and the developer [REDACTED])



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147. On the other hand, at least some of the competitive fringe within the iOS app distribution market does not appear to bundle app distribution to digital IAP mechanisms. AltStore has allowed users to pay \$3 per month to get “Beta Access” to the most recent iOS apps on the AltStore, and thus AltStore does not appear to have required IAP mechanisms at all.<sup>174</sup> Cydia provides iOS app distribution to jailbroken phones, and as far as I can tell has not required usage of its IAP mechanisms for any apps it has distributed.<sup>175</sup> It is not clear whether developers like TutuApp, who offer “pirate app stores” using Enterprise distribution, have required usage of their IAP mechanisms for any apps it has distributed.<sup>176</sup> Further, a fringe app distributor on Windows called itch.io lets the developer choose how much revenue to share with the platform, and thus has not required a commission on IAP transactions.<sup>177</sup>

148. The inference one can draw from this mixed evidence on whether other firms bundle or bundle the same items is unclear. The fact that many firms bundle the initial distribution of apps to digital IAP mechanisms within those apps could indicate it is efficient to bundle them together in a way that might suggest they should be treated as a single product.<sup>178</sup> But the fact that many firms do not bundle initial app distribution to nondigital IAP mechanism indicates that separating app distribution from IAPs is at least feasible and often desired by buyers, which provides threshold proof of separate products.<sup>179</sup> And the fact that several smaller fringe firms appear not to bundle the initial distribution of apps to digital IAP mechanisms suggests that such bundling may not be efficient and that the items should be treated as separate products.<sup>180</sup> If such a bundle of separate products is not efficient, the bundle’s use by firms with some degree (however small) of market power may reflect the fact that tying anticompetitively allows them to more fully exploit whatever market power they have by facilitating price discrimination.<sup>181</sup> In

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<sup>174</sup> Patreon, *Riley Testut* (available at <https://www.patreon.com/rileystestut> , last accessed May 15, 2021).

<sup>175</sup> See Part III, Section B.4.

<sup>176</sup> See Part III, Section B.3.c.

<sup>177</sup> See <https://itch.io/updates/introducing-open-revenue-sharing>.

<sup>178</sup> Schmalensee 2021-03-15 report in *Epic v. Apple* ¶¶ 227, 275-277.

<sup>179</sup> X AREEDA, ELHAUGE & HOVENKAMP, *ANTITRUST LAW* ¶ 1743 (1996).

<sup>180</sup> *Id.* ¶ 1744c4, 1744e.

<sup>181</sup> See, e.g., ELHAUGE, *U.S. ANTITRUST LAW & ECONOMICS* 411-12 (3d ed. 2018). Professor Schmalensee’s own arguments suggest that this bundle might facilitate a degree of price discrimination that would otherwise not be feasible. Schmalensee 2021-03-15 report in *Epic v. Apple* ¶¶ 237-38, 278.

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a differentiated market like the market for app distribution, even a firm with a small market share can enjoy significant market power.<sup>182</sup>

149. For purposes of my analysis, I need not take a stance on this market definition issue because my conclusions hold either way. If there is a single product market for iOS app and digital IAP distribution services, then Apple has a near-100% market share monopoly power in that market and Apple’s exclusivity restraints foreclosed 100% of that market.<sup>183</sup> If there are separate product markets, one for iOS app distribution and another for digital IAP mechanisms in iOS apps, then Apple would have a near-100% market share and monopoly power in both markets and Apple’s exclusivity restraints foreclosed 100% of each of those markets.<sup>184</sup> Thus, none of my conclusions about market shares or market power turn on whether those items are separate products. Nor do any of my conclusions about exclusivity restraints depend on a claim that Apple has tied iOS app distribution to digital IAP mechanisms (or reinforced that tie with anti-steering restraints) in a way that would make it relevant whether those were separate products.<sup>185</sup>

### ***E. Apple Experts’ Incorrect Arguments About Market Definition***

150. None of the economic experts retained by Apple in their related *Epic* litigation have correctly defined the relevant market. Here, I discuss two key errors in their analyses of market definition that led them to the incorrect conclusions. In summary:

1. Apple’s experts incorrectly conclude that there are separate markets for games versus non-games.
2. Apple’s experts incorrectly conclude that products that do not provide the distribution of native iOS apps (such as web apps and video game console app stores) are in the same market as the App Store.

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<sup>182</sup> See, e.g., ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 739-740 (3d ed. 2018). (discussing a case where post-merger market power was likely on a differentiated market even if the market share was 5.5%).

<sup>183</sup> See *infra* Part II.A (market shares); Part III (exclusivity restraints).

<sup>184</sup> *Id.*

<sup>185</sup> I do reach the quite distinct conclusion that Apple has increased its ability to impose the exclusivity restraints that foreclose iOS app and digital IAP distribution services by tying them to access to iOS devices. See *infra* Part III, Section C. But nothing in that claim turns on whether iOS app and digital IAP distribution services are a single market or separate markets. If they are a single market, then the tie to iOS devices forecloses one market, and if they are separate markets, then the tie to iOS devices forecloses two markets, but either way the anticompetitive effects are the same.

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*1. Apple’s Experts Are Mistaken in Finding Separate Markets for the Distribution of Games vs. Non-Games*

151. Apple’s experts have argued that there are separate markets for the distribution of game apps versus for the distribution of non-game apps.<sup>186</sup> Apple’s experts thus argue that the App Store’s transactions should be split into two separate markets for two different groups of transactions: (1) transactions involving “game” apps; and (2) transactions involving non-game apps.

152. Apple’s experts are mistaken on this point; there are not separate markets for game versus non-game markets. The following sections explain that:

- a. The product—iOS app distribution—is *the same* for every transaction, regardless of genre, even though the apps and in-app products vary between transactions. By analogy, when Amex processes a payment, the product Amex sells is always the same (payment processing) even though the physical product that the consumer obtains as a result of the transaction varies.
- b. To determine whether two groups of customers buying the same product are in two different markets, the relevant economic test is whether eliminating competition amongst the sellers of the product would cause prices to increase for one group of customers but not the other. Thus, there are separate markets for the distribution of games versus non-games only if eliminating competition in the iOS app distribution market would increase prices (i.e. commissions) for one group but not the other.
- c. Eliminating competition in the iOS app distribution market has increased commissions for *both* game and non-game transactions. Consequently, there are *not* separate markets for the distribution of games versus non-games.
- d. The arguments of Apple’s experts to the contrary are mistaken. They not only failed to identify the correct economic test, but also made objective

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<sup>186</sup> LaFontaine 2021-03-15 report in Epic v. Apple § 4.2 (“The ‘cluster market’ and ‘bundle market’ concepts do not warrant expanding the relevant product market beyond game transactions to include all digital app transactions.”); Hitt 2021-03-15 rebuttal report in Epic v. Apple ¶71 (“A broader market definition that goes beyond game transactions and includes all app transactions – whether transactions on a particular device, a particular operating system, or all devices more broadly – is inappropriate because game transactions face different competitive conditions from non-game apps.”); Schmalensee 2021-03-15 report in Epic v. Apple ¶ 8.vi.a (“I agree with Professors Lafontaine and Hitt that a relevant product market for game transactions in digital transaction platforms is the appropriate market to assess Epic’s claims in this matter.”).

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mathematical errors, so it is unsurprising that they reached the wrong conclusion.

153. Epic’s economic experts (Prof. Evans and Prof. Cragg) both agree with me that there are not separate markets for the distribution of games versus non-games.<sup>187</sup>

a. The Product—Native iOS App Distribution—Is the Same for Both Game and Non-Game Transactions

154. The App Store always provides a single product—a two-sided iOS app distribution platform—for every single transaction, even though the apps that are distributed vary between transactions. As an analogy, the payment processor Amex (another two-sided platform) always provides one product—payment processing—even though the goods that are purchased using Amex cards vary between transactions. In contrast, brick-and-mortar retailers such as Staples and GameStop, are “single-sided businesses” that literally sell different products directly to consumers (such as paper, printers, or video game consoles), rather than providing *transactions* between the manufacturers of these goods and the consumers.

155. Apple’s experts do not appear to dispute this basic point that consumers and developers are always purchasing the same product—the two-sided App Store platform—even though the apps themselves can vary for different transactions. Prof. Schmalensee explicitly acknowledges this point,<sup>188</sup> and Professors Hitt and LaFontaine never disavow it (although they do fail to realize the consequences of

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<sup>187</sup> Cragg 2021-03-15 report in Epic v. Apple ¶134 (“a games-only submarket is not a relevant market); Evans 2021-03-15 report in Epic v. Apple ¶122 (“Apple’s App Store restrictions cover the distribution of all iOS apps and mandate the use of IAP for all digital content purchases within iOS apps, without distinction based on the type of app, whether by game or non-game apps, or otherwise. The right economic question, therefore, isn’t whether games and non-games should be clustered together for analytical convenience. It is whether there is any basis for separating game apps and non-game apps in the first place for defining the relevant product market for evaluating Apple’s app-distribution restrictions.”).

<sup>188</sup> Schmalensee 2021-03-15 report in Epic v. Apple ¶20 (“In the Amex case, the Court correctly applied the relevant economic learning by observing that ‘[t]ransaction platforms are thus better understood as ‘supply[ing] only one product’—transactions.”); Schmalensee 2021-03-15 report in Epic v. Apple ¶23 (“[An art gallery] is properly analyzed as producing a single product: sales of paintings.”); Schmalensee 2021-03-15 report in Epic v. Apple ¶225 (“in the case of a transaction platform such as the App Store that supplies one product – transactions...”).

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it).<sup>189</sup> Prof. Schmalensee also explicitly acknowledges that brick-and-mortar retailers, such as Staples and GameStop, are instead single-sided businesses that literally do sell multiple different products, and once again Professors Hitt and LaFontaine never disagree.<sup>190</sup>

b. One Should Split Two Groups of Customers Buying the Same Product into Separate Price Discrimination Submarkets Only If Eliminating Competition Would Harm One Group But Not The Other

156. Because it is undisputed that iOS app distributors always sell the same product (iOS transactions), Apple’s argument is that one should *split* the sales of that one product into two separate markets for two groups of transactions: game transactions versus non-game transactions.

157. The Horizontal Merger Guidelines, which all experts in this case agree describe the relevant market definition methodology, explicitly describe the relevant economic test for determining when it is appropriate to define separate markets for two groups of customers purchasing the same product. The Merger Guidelines provide that separate price discrimination markets may be defined around targeted customers if a hypothetical monopolist “would profitably *and separately* impose at least a SSNIP” on those “*targeted* customers.”<sup>191</sup> Given this test, the Merger Guidelines do *not* state that one should define separate markets for different groups of customers whenever firms price discriminate between the two groups, a phenomenon that is common even in highly competitive markets.<sup>192</sup> Instead, under this test, the Merger Guidelines provide that one should split a single product into

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<sup>189</sup> As discussed below in subpart *d*, Professor LaFontaine fails to realize that “cluster” market principles apply only when one is attempting to “cluster” *multiple different products* together into a separate market.

<sup>190</sup> Schmalensee 2021-03-15 report in Epic v. Apple ¶8.vii.a (“traditional single-sided businesses such as a brick-and-mortar retailer like GameStop which acquires inventory and sells it to customers.”).

<sup>191</sup> Horizontal Merger Guidelines §4.1.4 (2010) (“If a hypothetical monopolist could profitably target a subset of customers for price increases, the Agencies may identify relevant markets defined around those *targeted* customers, to whom a hypothetical monopolist would profitably *and separately* impose at least a SSNIP. Markets to serve targeted customers are also known as price discrimination markets.”) (emphasis added).

<sup>192</sup> See Elhauge, *Why Above-Cost Price Cuts to Drive out Entrants Do Not Signal Predation or Even Market Power – and the Implications for Defining Costs*, 112 YALE LAW JOURNAL 681, 728 (2003) (collecting economic literature finding that price discrimination is common even in highly competitive markets); *id.* at 732-743 (explaining why price discrimination can occur even in highly competitive markets).



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separate markets for different groups of customers only if eliminating competition between sellers of the product would have anticompetitive effects that “vary significantly for different customers” by “raising price to certain targeted customers *but not to others*.”<sup>193</sup> Accordingly, “[i]n practice, the Agencies identify price discrimination markets *only* where they believe there is a realistic prospect of an adverse competitive effect on a group of *targeted* customers.”<sup>194</sup> Thus, if there is currently price discrimination across two sets of customers and eliminating competition in the product market would raise prices similarly for both sets, rather than targeting one set with a separate price increase, then separate markets should not be defined since the effects are similar for both sets. Separate markets should be defined only if eliminating competition would result in targeted effects, raising prices for one set of customers but not for the other set, which could merit treating the first set as a separate market.

158. For example, suppose that, in a competitive market, firms charged \$1.00 to one group of customers and \$2.00 to another group of customers. If, eliminating competition would cause these prices to rise to \$1.10 for the first group and \$2.20 to the second group (so a 10% increase to both groups), then it would *not* be appropriate to define separate price discrimination submarkets for the two groups, even though firms do in fact price discriminate between them, because eliminating competition would increase prices for *both* groups of customers, and thus would target neither. In such a situation, there is no reason to define separate markets since the anticompetitive effects are similar for both sets of customers.

159. Thus, in this case, it would be appropriate to split sales of the same product—iOS app distribution—into separate markets for “games” versus “non-games” only if eliminating competition among sellers of iOS app distribution (which includes iOS app distributors and direct iOS app distribution) would cause prices (i.e., commissions) to increase for game transactions but not for non-game transactions, or vice versa. Because Apple’s challenged conduct has in fact actually eliminated almost all competition among iOS app distributors in the actual world, Apple’s argument that there are separate markets for the distribution of games versus non-games logically depends on the premise that Apple’s conduct has in fact increased commissions for one of these groups but not the other. However, thus far

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<sup>193</sup> *Id.* §3 (“When examining possible adverse competitive effects from a merger, the Agencies consider whether those effects *vary significantly for different customers* purchasing the same or similar products. Such differential impacts are possible when sellers can discriminate, e.g., by profitably raising price to *certain targeted customers but not to others*.”) (emphasis added).

<sup>194</sup> *Id.* §4.14.3 (emphasis added).

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Apple’s experts have not identified which of the two groups they believe Apple’s challenged conduct has harmed. Apple’s experts thus have not even attempted to establish the key premise that is necessary for their conclusion that one should define separate price discrimination submarkets for the distribution of games versus non-games.

c. Eliminating Competition in the iOS App Distribution Market Increased Commissions for Both Game and Non-Game Transactions, So They Are Not Separate Price Discrimination Submarkets

160. Later in this report, I establish using common evidence that eliminating (essentially all) competition in the domestic iOS app distribution market anticompetitively inflated commissions for *both* game and non-game transactions.<sup>195</sup> One therefore should *not* define separate price discrimination submarkets for games versus non-game transactions under the Merger Guidelines market definition methodology.

161. The following two premises are each independently sufficient for establishing that eliminating competition in the domestic iOS app distribution market would anticompetitively inflate commissions for both games and non-games, rather than just one group or the other: (i) Apple does not actually price discriminate between games and non-games in the actual world; and (ii) the App Store would face increased competition for both game and non-game transactions in the but-for world.

162. *i. Apple Does Not Price Discriminate Between Games and Non-Games in the Actual World.* Apple applies the exact same commission structure to every app, and the “genre” of the app plays no role in that commission structure.<sup>196</sup> This directly indicates that Apple does not consider price discriminating between games and non-games to be profitable. Because the ability of a hypothetical monopolist to profitably price discriminate between the two groups of customers is a necessary (but not sufficient) condition for defining separate price discrimination submarkets, this evidence that Apple does not find it profitable to price discriminate between games and non-games affirmatively refutes Apple’s claim that one should define separate markets. Although Apple’s experts claim that “competitive conditions”

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<sup>195</sup> See *infra* Part IV (average effects); Part V.D (effects on games and non-games).

<sup>196</sup> See *infra* Part V.D.1.

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differ between games and non-games,<sup>197</sup> those purported differences evidently are not large enough to induce Apple to price discriminate between the two groups.

163. *ii. Apple Would Face Increased Competition for Both Game and Non-Game Transactions in the But-for World.* As explained in the prior section (**b**), the ability of a hypothetical monopolist to profitably price discriminate between two groups of customers is only a *necessary* condition for defining separate price discriminate submarkets for the two groups; it is not a sufficient condition. To establish separate price discrimination submarkets, one would also have to establish that eliminating competition would increase prices for only one group but not the other. Thus, evidence that eliminating competition in the domestic iOS app distribution market would similarly increase commissions for both groups of customers is independently sufficient to establish that one should not define separate markets for the two groups of customers.

164. Here, the App Store would face increased competition for both game transactions and non-game transactions in the but-for world that would predictably affect commissions for both in similar ways.

- But-for Apple’s challenged conduct, Apple would have to face increased competition from *direct distribution* of native iOS apps for both games and non-games. In other more competitive app distribution markets, game apps and non-game apps are both regularly directly distributed.<sup>198</sup>
- But-for Apple’s challenged conduct, Apple would have to face increased competition from *rival iOS app distributors* for both games and non-games because many rival iOS app distributors would distribute both game apps and non-game apps. For example, the Epic Game Store, which is in antitrust litigation with Apple in part so that it can enter the iOS app distribution market, distributes both game apps and non-game apps in the

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<sup>197</sup> Hitt 2021-02-16 report in Epic v. Apple ¶57 (“game transactions face different competitive conditions from non-game apps”); *id.* ¶106 (“the set of transaction platforms and devices available for game apps differs from the set of transaction platforms and devices for all apps.”); Hitt Rebuttal Report Exhibit 30 (purporting to calculate the App Store’s average in-app purchase commission rate” by genre); *id.* Exhibit 31 (purporting to calculate the App Store’s “average initial download commission rate by genre”). Professor Lafontaine and Schmalensee refer to these arguments made by Prof. Hitt, but do not add to them. See Lafontaine 2021-03-15 Report ¶104; Schmalensee 2021-03-15 Report ¶119.

<sup>198</sup> See *supra* note 82. (showing that Valve, Epic, and Argus Monitor all self-distribute on Windows or macOS).

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Windows and macOS app distribution markets.<sup>199</sup> Similarly, Cydia, a jailbreak iOS app distributor in the actual world, has distributed both games and non-games.<sup>200</sup> And many app distributors that currently cannot compete in the iOS app distribution market due to Apple’s challenged conduct, such as the Amazon App Store, also distribute both game and non-game apps.<sup>201</sup>

d. Apple’s Experts Used the Wrong Economic Test and Present Misleading Statistics When Arguing That There Are Separate Markets for the Distribution of Games Versus Non-Games

165. It is not particularly surprising that Apple’s experts reached a mistaken conclusion about whether to define separate markets for game transactions versus non-game transactions because they: (i) applied the wrong economic test; and (ii) made objective mathematical errors in their calculations and failed to account for the ways in which Apple actually price discriminates. I describe these errors below.

166. *i. Prof. Lafontaine Incorrectly Applied the “Cluster” Market Test to a Single Product.* Prof. Lafontaine’s entire analysis of whether the one should define separate markets for games versus non-games depends on the false premise that defining a single market for both games and non-games would require “clustering” separate products into a single market.<sup>202</sup> “Cluster markets” are markets that consist

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<sup>199</sup> As of May 20, 2021, the Epic Game Store includes the following non-game apps: (1) “KenShape”, a 3d-modeling app; (2) Krita, a painting app, (3) Brave, a web browser, (4) iHeart, a radio streaming app; (5) itch.io, an app store that focuses on independent games; and (6) Spotify, a streaming music app. Epic Games Store, Software Apps (available at <https://www.epicgames.com/store/en-US/browse?sortBy=releaseDate&sortDir=DESC&category=Software&count=40&start=0>).

<sup>200</sup> Complaint in Saurikit, LLC v. Apple INC., ¶4 (“Cydia became hugely popular by offering a marketplace to find and obtain third party iOS applications that greatly expanded the capabilities of the stock iPhone, including games, productivity applications, and audio/visual applications such as a video recorder”).

<sup>201</sup> See <https://www.amazon.com/gp/browse.html?node=2350149011>

<sup>202</sup> LaFontaine 2021-03-15 report in Epic v. Apple ¶ 93 (“Cluster markets instead refer to the combination of individual product markets where products are potentially bought and sold independently. With cluster markets, it would be appropriate to treat each underlying product market independently (which is different from bundle markets, where the bundle effectively constitutes the product). Under clustering, however, distinct products and product markets facing similar competitive conditions are combined for analytical convenience.”); *id.* ¶101 (incorrectly applying “cluster market” tests to the App Store).

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of *multiple products that are not substitutes for each other*.<sup>203</sup> For example, a market that included the sale of both paper and ink would be a “cluster” market because paper and ink are not substitutes for each other.

167. Cluster market principles do not apply to the iOS app distribution market because all of the products in this market (the two-sided App Store platform, rival two-sided iOS app distribution platforms, and direct distribution of native iOS apps) are all direct substitutes for each other. Indeed, another Apple expert, Prof. Schmalensee, explicitly acknowledged that the App Store provides one product for all transactions, rather than multiple different products.<sup>204</sup> Prof. Lafontaine never disputed Prof. Schmalensee’s point, but apparently failed to realize that it made “cluster market” principles irrelevant.

168. Nor does Prof. Lafontaine’s analogy to cluster markets for brick-and-mortar office supply stores support her claim that a single iOS app distribution market would cluster multiple products together.<sup>205</sup> Prof. Lafontaine failed to realize that: (1) cluster market principles *do* apply to office supply stores because such businesses are *single-sided* businesses that do in fact sell multiple different products that are not substitutes for each other (such as paper and ink); whereas (2) cluster market principles do *not* apply to app distributors because they are two-sided platforms that always sell a single product. Another one of Apple’s experts, Prof. Schmalensee, explicitly acknowledged that brick-and-mortar stores like Staples are single-sided businesses that “acquire[] inventory and sell[] it to customers” and thus sell multiple products instead of one.<sup>206</sup> Prof. Lafontaine never disputed this point, but apparently failed to realize that this key distinction between office supply stores and app distributors make cluster market principles apply to the former but not the latter.

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<sup>203</sup> The economic literature that Prof. Lafontaine cites acknowledges this basic point. *See* Krisha Cerilli, *Staples/Office Depot: Clarifying Cluster Markets*, COMPETITION POLICY INTERNATIONAL (published August 15, 2016) (cited by Lafontaine 2021-03-15 report in *Epic v. Apple* n. 169) at 3 (“In *ProMedica*, for instance, which involved a hospital merger, the merging hospital offered hundreds of distinct medical procedures that were not functionally interchangeable (e.g., chemotherapy is not a substitute for hip replacement. Each distinct procedure could therefore be assessed as a distinct relevant market. ... That is where the cluster market concept arises. *ProMedica* endorsed the concept of aggregating distinct relevant markets into a single ‘cluster’”).

<sup>204</sup> Schmalensee 2021-03-15 report in *Epic v. Apple* ¶¶225 (“in the case of a transaction platform such as the App Store that supplies one product— transactions...”).

<sup>205</sup> LaFontaine 2021-03-15 report in *Epic v. Apple* ¶¶100-101.

<sup>206</sup> Schmalensee 2021-03-15 report in *Epic v. Apple* ¶8.vii.a (“traditional single-sided businesses such as a brick-and-mortar retailer like GameStop which acquires inventory and sells it to customers.”).



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169. *ii. Prof. Hitt Statistics Purporting to Show Price Discrimination Between Games and Non-Games Are Unreliable.* Prof. Hitt has presented statistics that he claims show that Apple charges different effective commissions for games versus non-games.<sup>207</sup> As I discuss more below in Part V.D.1, Prof. Hitt’s statistics purporting to show price discrimination between games and non-games depend not only on an objective mathematical error, but also ironically on Prof. Hitt *failing to account for the ways in which Apple actually does price discriminate*. Correcting Prof. Hitt’s errors shows that Apple *applies the exact same commission structure to both games and non-games*, and thus that Apple does not price discriminate between games and non-games.<sup>208</sup>

170. In short, the App Store’s average commission percentage for games is somewhat higher for games than for non-games because: (1) Apple always charges a 30% commission for one-time in-app purchases, but charges a lower 15% commission for subscriptions that have lasted over one year; and (2) games on average are more likely to use one-time in-app purchases. Thus, Apple’s commission structure does not actually provide for a different commission percentage for games, but rather instead happens to result in somewhat higher average commissions for games just because of the monetization strategies that games apps generally use.

171. As an analogy, suppose a shipping company charges \$5 to ship packages that weigh between 0-2 pounds and \$10 for packages between 2.01-5 pounds. The shipping company would consequently usually charge \$10 for economics textbooks (which tend to be quite heavy) and only \$5 for children’s books (which tend to be lighter). Even though the average price of shipping would be higher for economics textbooks than for children’s books, it would be incorrect to conclude that the shipping company was price discriminating based on the genre of book, but Prof. Hitt’s fallacious methodology would reach that exact conclusion.

*2. Apple’s Experts Are Wrong that the Relevant Market Is Broader than the iOS App Distribution Market*

172. Apple’s experts incorrectly conclude that the relevant market includes products that do not distribute native iOS apps to iOS devices. For example, Apple’s experts argue that the relevant market should also include the Google Play Store (an

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<sup>207</sup> See *infra* Part V.D.1

<sup>208</sup> See *infra* Part V.D.1.

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Android app distributor), the PlayStation Store (Sony’s digital app distribution platform for its PlayStation video game consoles), and Steam, among others.<sup>209</sup> Ultimately, the Apple experts’ position is that the relevant market should include not only products that actually distribute native iOS apps (like the App Store), but also:

- (a) Any platform that can distribute *any* version of an app, even versions for other operating systems (like Android or Windows) or mobile browsers (like Google Stadia); and
- (b) Any platform on which a consumer can purchase a digital product that can be consumed within a native iOS app. For example, if a native iOS app includes virtual currency that can also be purchased in versions of the app on other platforms (like a Windows version), then Apple’s experts argue that the market should include all purchases of the virtual currency on both the iOS and non-iOS versions of the app.<sup>210</sup>

173. The Apple experts’ basic mistake is to include (just about) every product that consumers and/or developer *possibly can* substitute to, rather than the smallest set of closest substitutes that passes the Hypothetical Monopolist test. The Merger Guidelines are clear that properly defined markets usually “exclude some substitutes to which some customers might turn” in response to a price increase for the products in the relevant market.<sup>211</sup> Economists define markets to focus only on

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<sup>209</sup> Hitt 2021-03-15 report in Epic v. Apple, Exhibit 2 (listing “transaction platforms that provide digital game transactions” that Prof. Hitt asserts are in the same relevant market as Apple’s App Store).

<sup>210</sup> Hitt 2021-03-15 report in Epic v. Apple ¶73 (“game developers successfully use a variety of alternative transaction platforms to conduct game transactions on a variety of types of devices.”); Hitt 2021-03-15 report in Epic v. Apple ¶88 (“developers can enable customers to use the digital products or in-game currency they purchase through these alternative platforms on their iOS devices. Indeed, many game developers link in-game content and game progression across a user’s devices by having a common user account which spans different game transaction platforms. For example, King (the developer of Candy Crush Saga and other popular games) offers a ‘Kingdom’ account which enables players to transfer in-game currency (e.g., ‘gold bars’) and progression within each game across devices. Thus, a consumer who had been playing Candy Crush Sag on an iPhone can transfer currency and progress to an Android device (and vice versa) as well as between other devices the consumer uses.”).

Technically, Apple’s experts argue the market should be expanded in such a way only for “game” apps, but their incorrect “games versus non-games” market definition is a separate issue that I discussed in the previous section.

<sup>211</sup> DOJ/FTC Horizontal Merger Guidelines §4 (2010) (“Market shares of different products in narrowly defined markets are more likely to capture the relative competitive significance of these products, and often more accurately reflect competition between close substitutes. As a result, properly defined antitrust markets often exclude some substitutes to which

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close substitutes because “defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares” that overstate the importance of distant substitutes.<sup>212</sup> This means that the mere fact that some customers substitute between Products A and B does not necessarily mean that Products A and B are in the same market. Indeed, “The hypothetical monopolist test may identify a group of products as a relevant market even if customers would substitute significantly to products outside that group.”<sup>213</sup>

174. In general, following Apple’s experts’ methodology of including essentially every substitute, including distant ones, would lead to absurdly broad and unhelpful market definitions, such as a market for “all transportation methods” that included cars, motorcycles, buses, trains, airplanes, and bicycles. The Horizontal Merger Guidelines explicitly warn not to do that,<sup>214</sup> but Apple’s experts do not heed that warning.

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some customers might turn in the face of the price increase even if such substitutes provide alternatives for those customers.”); *id.* §4.1.1 (“Groups of products may satisfy the hypothetical monopolist test without including the full range of substitutes from which customers choose.”). Relatedly, official commentary to the Merger Guidelines explains that “Even when no readily apparent gap exists in the chain of substitutes, drawing a market boundary within the chain may be entirely appropriate when a hypothetical monopolist over just a segment of the chain of substitutes would raise prices significantly.” DOJ/FTC, Commentary on the Horizontal Merger Guidelines 15 (2006). The Merger Guidelines likewise explain that “relevant markets need not have precise metes and bounds.” DOJ/FTC Horizontal Merger Guidelines §4 (2010).

<sup>212</sup> DOJ/FTC Horizontal Merger Guidelines §4 (2010) (“Defining a market broadly to include relatively distant product or geographic substitutes can lead to misleading market shares. This is because the competitive significance of distant substitutes is unlikely to be commensurate with their shares in a broad market. Although excluding more distant substitutes from the market inevitably understates their competitive significance to some degree, doing so often provides a more accurate indicator of the competitive effects of the merger than would the alternative of including them and overstating their competitive significance”).

<sup>213</sup> DOJ/FTC Horizontal Merger Guidelines §4.1.1 (2010); American Bar Association, MARKET DEFINITION IN ANTITRUST: THEORY AND CASE STUDIES, I.B.2.b.(1). (2012) (“The hypothetical monopolist test may be satisfied by a group of products even though it does not include the full range of substitutes available to buyers.”).

<sup>214</sup> DOJ/FTC Horizontal Merger Guidelines §4 (“Example 4: Firms A and B, sellers of two leading brands of motorcycles, propose to merge. If Brand A motorcycle prices were to rise, some buyers would substitute to Brand B, and some others would substitute to cars. . However, motorcycle buyers see Brand B motorcycles as much more similar to Brand A motorcycles than are cars. Far more cars are sold than motorcycles. Evaluating shares in a market that includes cars would greatly underestimate the competitive significance of Brand B motorcycles in constraining Brand A’s prices and greatly overestimate the significance of cars.”).

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175. Ultimately, the following two premises, when combined, are sufficient to establish that all products that do not provide the installation of native iOS apps are outside of the relevant market:

- (i) All products that do *not* provide the installation of native iOS apps (e.g., Play Store, PlayStation Store, Steam) are more distant substitutes to the App Store than the products that *do* provide the installation of native iOS apps (the App Store, rival iOS app distributors, and direct distribution of native iOS apps)
- (ii) A posited market limited to just the products that can install native iOS apps is sufficiently broad under the Hypothetical Monopolist test.

176. I established point (i) when ranking the substitutes for the App Store from closest to most distant, above in Sections B.3-6. I established point (ii) when implementing the Hypothetical Monopolist test for the domestic iOS app distribution market, above in Section C.

177. To be clear, my conclusion that the market is limited to products that distribute native iOS apps does *not* depend on the premise that developers and/or consumers *never* (or even rarely) substitute between the App Store and methods of distributing apps for other platforms (such as the Google Play Store or Steam). Nor does my market definition conclusion depend on the premise that developers and/or consumers *never* (or even rarely) substitute between purchasing digital goods on the App Store and purchasing the same digital goods on another platform. Instead, my conclusion depends only on the premises that: (1) consumers and developers substitute from the App Store to these other more distant substitutes *less often* than they would substitute to other methods of iOS app distribution (if they were available); and (2) that allowing unrestrained competition in the iOS app distribution market would cause average commissions to decrease by at least 5 percent from Apple’s current 100% monopoly price. Neither premise seems controversial, nor have I seen Apple’s experts dispute either premise or present any evidence that contradicts either premise.

178. Nor does my conclusion that distributors that cannot install native iOS apps are outside the relevant market depend on the premise that such distributors provide *no* constraint on Apple’s ability to raise the App Store’s commissions. Competition from distant substitutes, such as the Google Play Store and Steam, does provide some small constraint on Apple’s ability to raise the App Store’s commission. But that competition from the distant substitutes is not itself sufficient to prevent Apple from charging a price that is at least 5% above the competitive level, as I establish above in Section C, where I implement the Hypothetical

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Monopolist test. The complete elimination of competition within the domestic iOS app distribution market (which Apple has essentially achieved) is sufficient to raise prices significantly above the competitive level, despite the existence of distant substitutes, such as the Google Play Store and Sony PlayStation store. The economic experts Epic has retained, Prof. Evans and Prof. Cragg, both agree with me that the relevant market excludes more distant substitutes such as the Google Play Store, Steam, and the PlayStation Store.<sup>215</sup>

179. Apple’s economic experts cites evidence that developers often “multi-home” on the iOS App Store and the Google Play Store (i.e., distribute each of their apps through both the iOS app Store and the Google Play Store) in support of their conclusion that the iOS App store and the Google Play Store are substitutes.<sup>216</sup> However, evidence of “multi-homing” an app among multiple app distributors is *not* evidence of *substitution* between those app distributors by either developers or distributors. Apple’s expert’s logical premise is literally that the observation that a developer has distributed its app through both distributors *A* and *B* shows “substitution” between distributors *A* and *B*. That logical premise is mistaken. Economists measure substitution by measuring how much customers *switch* between products *when their prices change*, not based on how often customers buy both product *A* and product *B*. Indeed, Apple’s expert’s logical premise—that evidence of the same person purchasing products *A* and *B* indicates that the person substitutes between products *A* and *B*—would lead to the absurd conclusion that toilet paper and phones are close substitutes between just about everyone buys both a toilet paper and a phone. In contrast, if one used the correct measure of substitution, one would find that people do not change the quantity of toilet paper they purchase when the prices of phones increased, which quantitatively confirms the common sense point

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<sup>215</sup> Cragg 2021-03-15 report in Epic v. Apple ¶16b (“For both consumers and developers, game distribution through Windows-based PCs, game consoles like PlayStation, Xbox and Nintendo Switch (Switch) and Apple Macs, are not in the same market as game and app distribution for smartphone platforms like iOS.”); *id.* ¶50a (“developers do not consider the choice between the Apple App Store and Google Play as alternative or competing channels to reach the *same user*. ... [Consequently,] these platforms are alternatives but no economic substitutes.”); Evans 2021-02-16 report in Epic v. Apple ¶448 (“iOS app distribution, for users and developers, is a relevant antitrust market”).

<sup>216</sup> Hitt 2021-02-16 report in Epic v. Apple ¶50 (“The fact that consumers and developers multi-home across devices and digital transaction platforms constrains Apple from exercising any alleged market power.”).



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that toilet paper and phones are not substitutes. Epic expert Prof. Cragg makes a similar observation in his expert report in *Epic v. Apple*.<sup>217</sup>

## II. APPLE HAS A HIGH MARKET SHARE AND SIGNIFICANT MARKET POWER IN ALL POTENTIALLY RELEVANT MARKETS

180. In this Section I evaluate Apple’s market shares and market power in a number of potentially relevant markets. First, I find that Apple has had a near-100% market share in the U.S. market for iOS app and digital IAP distribution services, which is the relevant market for assessing effects from the alleged anticompetitive conduct in this case.<sup>218</sup> Second, I show that Apple has had dominant and increasing market shares in the U.S. smartphone and tablet markets. Third, I show that even if one (conservatively but incorrectly) broadened the market for iOS app and digital IAP distribution services to include all app and digital IAP distribution services on mobile devices, Apple’s would still have a dominant market share. Fourth, I show that Apple has possessed monopoly power (and thus necessarily market power) in the U.S. market for iOS app and digital IAP distribution services, and even if one (conservatively but incorrectly) broadened the market to include all app and digital IAP distribution services, Apple would still have had monopoly power and market power. Finally, I analyze iOS app and digital IAP distribution services as an aftermarket to the smartphone and tablet markets and explain why competition in the latter markets has not constrained Apple’s monopoly power (and market power) in the U.S. market for iOS app and digital IAP distribution services.

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<sup>217</sup> Cragg (Epic Expert) 2021-03-15 report in *Epic v. Apple* ¶14 (“just because a user ‘regularly uses’ one device or several devices, or whether she ‘has access’ to one or multiple devices is *insufficient* for the relevant economic analysis. That is a mistake the Apple experts make in many of their analyses: by their logic, refrigerators and TVs (let alone stereos and TVs) are in the same market because users ‘have access’ to or ‘regularly use’ both.”).

<sup>218</sup> My conclusions throughout this Part would not be affected if one instead defined separate markets for initial app distribution and digital IAP mechanisms because Apple would have similar market shares and market power in each of those markets, given that sales in those two markets are bundled together.

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***A. Apple Has Had a Near-100% Share of the U.S. Market for iOS App and Digital IAP Distribution Services***

*1. Apple’s Near-100% Market Share*

181. As discussed in Part III, Apple has used exclusivity restraints to foreclose 100% of the worldwide (and thus also the U.S.) market for iOS app and digital IAP distribution services. As a result, the only rivals in this market have been the few distributors who were willing and able to both violate Apple’s contractual conditions and circumvent Apple’s technological restraints. These include TuTuApp (an app store that has used Enterprise certificates in violation of Apple’s agreements); AltStore (an app store that has attempted to distribute apps through free Xcode provisioning); and Cydia (a jailbreak app store).<sup>219</sup> But all of these firms have had relatively trivial sales dwarfed by Apple. As the following paragraphs explain, Apple has had at least a 99.46% of the domestic market for iOS app and digital IAP distribution services during the class period, even if one makes multiple conservative assumptions that likely overstate the shares of the rival iOS app distributors.

182. *TuTuApp and Other “Pirate” App Stores that Use Enterprise Certificates Have Had at Most a [REDACTED] Share Combined.* As discussed below in Part III.B.3.c, rival iOS app distributors like TuTuApp have used Apple’s “Enterprise distribution” program to distribute apps to iOS device users in violation of Apple’s developer agreements. There is little available evidence on the size of these “pirate” app stores, but the available evidence indicates that they have constituted a trivial share of the domestic iOS app distribution market. A news article reported in February 2019 that “the pirate distributors combined have more than 600,000 followers on Twitter,” and “make money by charging \$13 or more per year for subscriptions to what they call ‘VIP’ versions of their services.”<sup>220</sup> Their combined number of Twitter followers is likely an overestimate of the number of users who

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<sup>219</sup> See *infra* Part III.B.

<sup>220</sup> CNBC, *Pirates found a way to load paid apps on iPhones for free and Apple could be losing money* (published February 14, 2019, available at <https://www.cnbc.com/2019/02/14/pirates-load-hacked-paid-apps-on-iphone.html>) (“Using so-called enterprise developer certificates, these pirate operations are providing modified versions of popular apps to consumers.... By doing so, the pirate app distributors are violating the rules of Apple’s developer programs, which only allow apps to be distributed to the general public through the App Store. ...The [Enterprise] distributors make money by charging \$13 or more per year for subscriptions to what they calls[sic] ‘VIP’ versions of their services, which they say are more stable than the free versions. It is impossible to know how many users buy such subscriptions, but the pirate distributors combined have more than 600,000 followers on Twitter.”).

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have signed up for their “VIP” programs in the United States, given that: (a) it is free to “follow” an enterprise distributor on Twitter, but a user must actually pay money for the VIP service; and (b) the number of twitter followers is worldwide, whereas the relevant geographic market (at least for this class report) is limited to the United States. Nonetheless if, to be conservative, one assumed that all of these Enterprise distribution “pirate” app stores combined had 600,000 users signed up for their “VIP” services in 2019, that each such user paid \$13 per year, and that each user was in the United States, then their annual total revenues in the domestic iOS app distribution market would be \$7.8 million as of February 2019. In contrast, Apple earned [REDACTED] in commissions from domestic iOS app distribution for the twelve-month period from March 2018 to February 2019.<sup>221</sup> Thus, even if one makes multiple assumptions that likely overestimate the pirate Enterprise app stores’ total revenues in the market, they would equate to only [REDACTED] of Apple’s commissions from domestic iOS app distribution.

183. *AltStore Has Had at Most a [REDACTED] Share.* The AltStore entered the market in September 2019 and made less than \$15,000 per month as of May 2021.<sup>222</sup> This compares to the over [REDACTED] per month that Apple made in September 2019 on sales of native iOS app and in-app digital products via its app stores in the United States.<sup>223</sup> The AltStore’s revenues are therefore only [REDACTED] (\$15,000/[REDACTED] of Apple’s commissions from domestic iOS app distribution. Even this [REDACTED] uses the defense-friendly assumption that all of the AltStore’s revenues come from within the relevant geographic market (the United States).

184. *Cydia Has Had at Most a [REDACTED] Share.* Cydia’s developer stated in 2020 that that “Cydia’s revenue peaked in 2011 and 2012, when it brought in about

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<sup>221</sup> “ELOC716 Apple iOS app distribution comms March 2018-Feb 2019.txt”.

<sup>222</sup> Patreon, *Riley Testut* (available at <https://www.patreon.com/rileytestut> , last accessed May 15, 2021). Riley Testut is the developer of AltStore and Delta. AltStore users can pay \$3 per month to get “Beta Access” to the most recent apps on the AltStore. As of May 2021, Patreon reports that the developer of AltStore receives \$14,599 per month through Patreon. Riley Testut, *Introducing AltStore* (published September 25, 2019, available at <http://rileytestut.com/blog/2019/09/25/introducing-altstore/>).

<sup>223</sup> In September 2019 (the most recent month for which Apple has produced transaction data thus far), Apple’s total commissions from the App Store in the United States were [REDACTED]. “ELOC716 Apple iOS app distribution comms Sep 2019.txt”.

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\$10 million.”<sup>224</sup> I lack a source on just how much Cydia’s revenues have dropped since 2012, so I adopt \$10 million as a highly conservative (i.e., defense-friendly) over-estimate of Cydia’s annual revenue during the class period. This assumption is particularly conservative because Cydia ceased accepting payments in December 2018, in part because it was no longer profitable for Cydia’s developer.<sup>225</sup> I add the further conservative assumption that all of Cydia’s revenue came from within the United States. Even with both those highly conservative assumptions, Cydia has accounted for a trivial share of the domestic iOS app distribution market. From the start of the class period (June 4, 2015) to the end of Apple’s current transaction data (September 2019), developers on average paid Apple [REDACTED] in commissions per year on sales through Apple’s U.S. app stores.<sup>226</sup> Cydia’s revenues during the class period were therefore less than [REDACTED] (\$10 million [REDACTED] of Apple’s commissions in the relevant market during the class period.

185. *All Rival iOS App Distributors Combined Have Had at Most a 0.54% Share of the Relevant Market.* The evidence in the previous paragraphs indicates that all of the rivals in the domestic iOS app distribution market combined have had revenues equal to at most 0.54% of Apple’s commissions in the relevant market during the class period.<sup>227</sup> This means Apple’s share of the domestic iOS app distribution market during the class period was at least 99.46%.<sup>228</sup>

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<sup>224</sup> Reed, Albergotti, *The ‘app store’ before there was an App Store wants to liberate your iPhone* ... again (published December 10, 2020, available at <https://www.washingtonpost.com/technology/2020/12/10/cydia-apple-lawsuit/>) (“There were so many people using [Cydia] that [Freeman, the founder of Cydia] estimated half of early iPhone customers must have been ‘jailbreaking’ their phones to take advantage of the additional features it offered. In 2010, Freeman told the Washington Post that Cydia had 4.5 million people searching for apps every week. . . Cydia’s revenue peaked in 2011 and 2012, when it brought in about \$10 million, Freeman said. Cydia, like Apple, charged developers a commission on sales.”).

<sup>225</sup> See [https://www.reddit.com/r/jailbreak/comments/a5wfg9/news\\_andrew\\_wiik\\_recommends\\_that\\_everyone\\_removes\\_ebpur5a/?context=1](https://www.reddit.com/r/jailbreak/comments/a5wfg9/news_andrew_wiik_recommends_that_everyone_removes_ebpur5a/?context=1) (forum post by “saurik” the username of Cydia’s developer. In the post, he states “this service [Cydia] loses me money”).

<sup>226</sup> “ELOC790 apple average commissions per year during class period.txt”.

<sup>227</sup> [REDACTED] (AltStore) + [REDACTED] (Cydia) + [REDACTED] (Enterprise distribution pirate app stores) = [REDACTED]

<sup>228</sup> If all the rivals combined sales’ in the relevant market are 0.54% of Apple’s revenues in the relevant market, then Apple’s market share is  $100/(100+0.54) = 99.46\%$ .

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*2. This Is Not a Single-Brand Market*

186. Apple’s experts in the *Epic* litigation have made legal claims about whether a single brand can be its own market. I take no position on such legal claims. But it is important to understand that, as a matter of economics, the market for iOS app and digital IAP distribution services that I have defined is *not* a single-brand market because I have defined the market to be neutral as to who is actually providing the iOS app and digital IAP distribution services. In contrast, a single-brand market would, as a matter of economics, be defined based on the brand of the product being provided: i.e., it would be defined as *Apple* provision of iOS app and digital IAP distribution services. That is not the case here. Instead, here we have a brand-neutral market in which Apple has achieved a near-100% market share by excluding competitors.

187. Apple does not even deny the fact that it affirmatively forecloses all competitors in the iOS app distribution market; Apple instead argues (mistakenly) that doing so is not anticompetitive. The argument of Apple’s experts thus misleadingly conflates a single-brand market with a brand-neutral market in which one firm has achieved a near-100% market share by excluding rivals with anticompetitive restraints. Calling them both single-brand markets misleadingly groups what are entirely different economic situations. Apple’s experts’ conflation of the two, coupled with their assertions about the law, would lead to the perverse implication that whenever any entity achieves a 100% or near-100% monopoly in a brand-neutral market by anticompetitively excluding all other competitors, that market would become a “single-brand” market that could not legally be defined. That would mean that the worst possible monopolizing conduct—that which achieves 100% or near-100% market share by eliminating every significant competitor—would bootstrap the successful monopolist into a broader market definition that could confer legal immunity from a monopolization claim.

188. However one resolves the above issues, conclusions about Apple’s market share in the U.S. market for iOS app and digital IAP distribution services and about whether that constitutes a single-brand market are necessarily common to the class. The calculation of that market share and characterization of the market would be the same for all class members, and the evidence and method used to reach those conclusions would likewise be the same for all class members.



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***B. Apple Has a Dominant and Increasing Share of Both the Smartphone and Tablet Markets in the United States***

189. As discussed in Part III, Apple requires users of iOS devices to use Apple’s app stores for iOS app distribution. In this section I analyze Apple’s market share in the U.S. smartphone and tablet markets.

190. The standard method for measuring market shares is by revenue.<sup>229</sup> As the U.S. Merger Guidelines state: “Revenues in the relevant market tend to be the best measure of attractiveness to customers, since they reflect the real-world ability of firms to surmount all of the obstacles necessary to offer products on terms and conditions that are attractive to customers.”<sup>230</sup> Further, the Guidelines point out that measuring market shares by revenue shares is particularly advised “where customers sign long-term contracts, face switching costs, or tend to re-evaluate their suppliers only occasionally.”<sup>231</sup> That is the case here because many smartphone or tablet customers sign long-term contracts with cellular providers linked to particular devices,<sup>232</sup> face large costs (estimated to be over \$100) in switching from one device OS to another,<sup>233</sup> and tend to re-evaluate device suppliers only occasionally given that on average people hold on to their smartphone for 2.6 years and, even when they purchase a new device, switch device operating systems only 9-15% of the time.<sup>234</sup>

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<sup>229</sup> DOJ/FTC Horizontal Merger Guidelines §5.2 (2010) (“In most contexts, the Agencies measure each firm’s market share based on its actual or projected revenues in the relevant market.”)

<sup>230</sup> *Id.* Apple’s experts in the *Epic* litigation acknowledged that these guidelines state the standard methodology used to define relevant markets. *See supra* Part I, Section A.

<sup>231</sup> DOJ/FTC Horizontal Merger Guidelines §5.2 (2010).

<sup>232</sup> “Are Free Smartphones Really Free”, March 21, 2018, Tara Donnelly, WhistleOut, available at <https://www.whistleout.com/CellPhones/Guides/can-you-really-get-a-smartphone-for-free> (noting the “old model of wireless subsidization” that required customers to sign up for two-year contracts in exchange for a subsidized device and describing current variations on these including subsidies with explicit installment plans dividing the device cost over 24 months and requiring that customers pay the outstanding device balance if they leave the cellular provider prior to the end of the 24 month period).

<sup>233</sup> *See infra* Part II, Section E.3.

<sup>234</sup> *Id.* Measuring market shares by unit shares can sometimes make sense when lower-priced units are good substitutes for higher-priced units. *See* DOJ/FTC Horizontal Merger Guidelines §5.2 (2010). But that is not the case here not only because of the factors mentioned in the text, but also because device quality varies so greatly that lower-priced units are often not good substitutes for higher-price units.

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191. Apple’s experts do not appear to dispute that the relevant geographic market is the United States.<sup>235</sup> In a related litigation, Epic’s economic expert (Prof. Evans) has opined that the iPhone competes in a product market that includes all smartphones.<sup>236</sup> It is unclear what Apple’s economic experts believe is the relevant market in which the iPhone competes, but one expert appears to imply that it is the “smartphone market.”<sup>237</sup> A product market limited to smartphones is surely sufficiently broad under the Hypothetical Monopolist Test; smartphone users are unlikely to substitute to non-smartphones in response to a 5% increase in smartphone prices given that non-smartphone alternatives, such as laptops and video game consoles (1) are not as portable (even the smallest video game console, the switch, at least 1.75 times larger;<sup>238</sup> (2) can perform only limited functions (such as video game consoles); and/or (3) cannot make phone calls. However, there may be narrower markets that would also pass the Hypothetical Monopolist; for instance, a market limited to higher-end smartphones like Apple’s iPhones and Samsung’s Galaxy phones, which are closer substitutes to each other than they are to lower-end smartphones.<sup>239</sup> However one defines the smartphone market, it would be a classwide issue because the same market definition would be true for all class members and its definition would be based on the same evidence and methods for all class members.

192. Even if one conservatively assumes a broad product market for all smartphones in the United States, Apple has a high market share indicative of market

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<sup>235</sup> Lafontaine 2021-03-15 expert report in Epic v. Apple § 5.1 (“The relevant antitrust geographic market is the United States”).

<sup>236</sup> Evans 2021-02-16 expert report in Epic v. Apple, section V.B (“Smartphone Operating Systems Are the Relevant Antitrust Foremarket for App Distribution.”). Essentially all smartphones purchased by consumers have operating systems pre-installed; there is no evidence that consumers have any demand for smartphone hardware without a pre-installed operating system. Thus, from a consumer’s perspective, the smartphone operating system and the smartphone device is a single product.

<sup>237</sup> Lafontaine 2021-03-15 expert report in Epic v. Apple, ¶113 (“... a smartphone where the iPhone would compete ...”).

<sup>238</sup> The Nintendo Switch is 9.4” x 4” x 0.55” (making its volume 20.68 inches cubed) and weighs 0.88 lbs with the controllers attached. See <https://www.nintendo.com/switch/tech-specs/>. By comparison, the largest iPhone that Apple currently sells (the iPhone 12 Pro Max), is 6.3” x 3.1” x 0.3” (making its volume 5.9” cubed) and weighs 0.5 lbs. See <https://www.apple.com/iphone/compare/?modelList=iphone12promax,iphone12,iphone12mini>. The Switch is therefore 1.75 times heavier than the largest iPhone, and 3.5 times more voluminous.

<sup>239</sup> Android Authority, *The best iPhone 12 alternatives* (available at <https://www.androidauthority.com/iphone-12-alternatives-1166021/>) (“1. Samsung Galaxy S21 series. Samsung is Apple’s arch-rival in the mobile space.”).

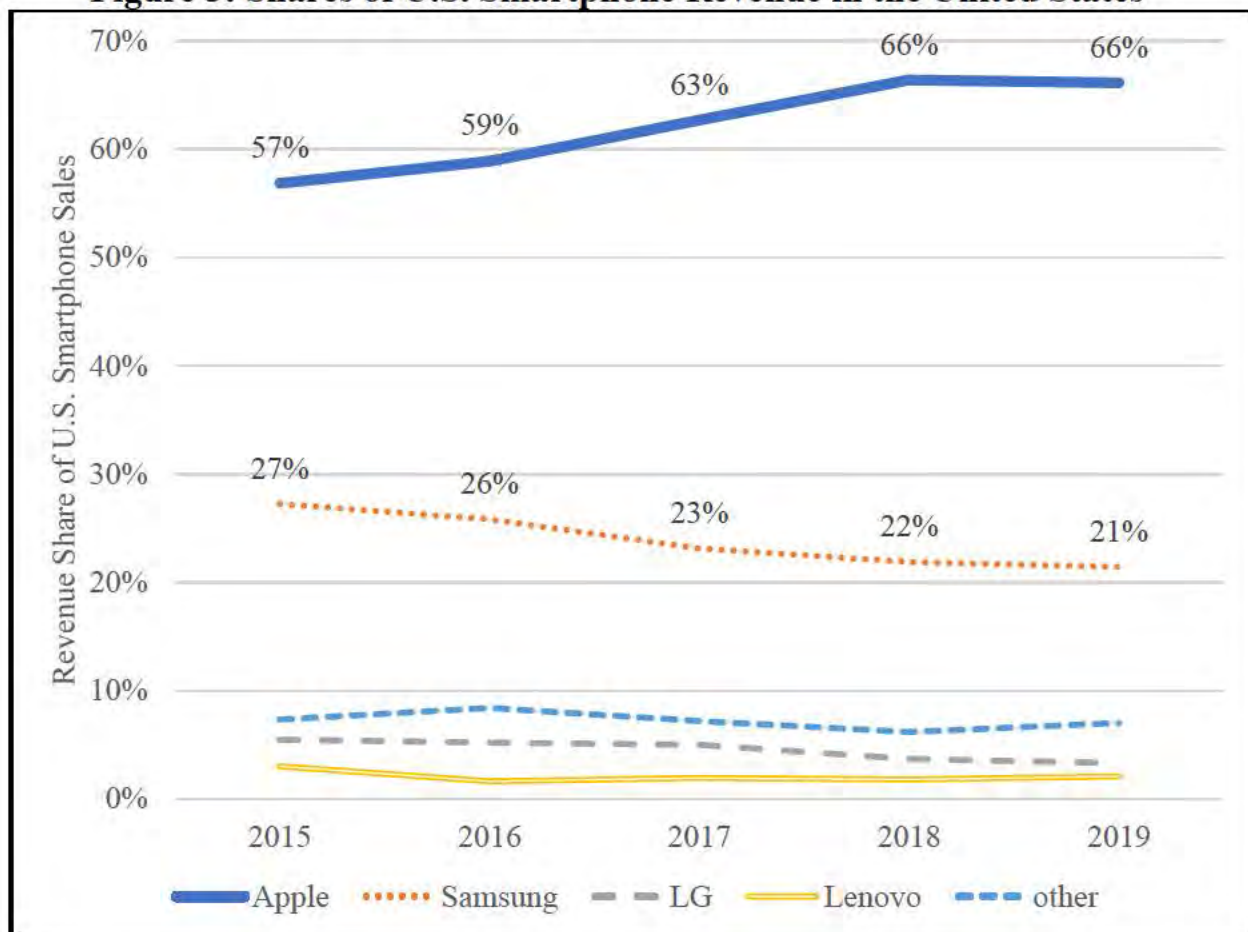
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power. In this market, Apple had a revenue market share that ranged from 57% to 66% from 2015 to 2019 and was increasing throughout the class period.<sup>240</sup> Figure 3 below also shows other smartphone manufacturers’ revenue market shares and demonstrates Apple’s dominant market position relative to other smartphone makers. Because these market share calculations include both higher-end smartphones (such as Apple’s) and lower-end smartphones, these market shares conservatively underestimate Apple’s market share if the hypothetical monopolist test would support a conclusion that Apple’s smartphones compete in a narrower market limited to higher-end smartphones. I do not yet have an opinion on whether a narrower market limited to high-end smartphones would be sufficiently broad under the Hypothetical Monopolist test.

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<sup>240</sup> “ELOC183 US smartphone rev shares simplified.csv”. Original data source was IDC\_Quarterly\_Mobile\_Phone\_Tracker\_-\_Final\_Historical\_2020Q3\_ModelName.csv, produced as part of Prof. Evans’ 2021-02-16 backup. Chart begins with the year in which the class period began (2015) and ends at the last full year of available data (2019).

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**Figure 3: Shares of U.S. Smartphone Revenue in the United States<sup>241</sup>**

193. Similarly, Apple’s iPad most likely competes in a market for all U.S. tablets or a narrower market for higher-end U.S. tablets. In the U.S. market for tablets from 2015 to 2019, Apple had a revenue market share that ranged from 55% to 63% and increased during the class period.<sup>242</sup> Figure 4 below also shows other tablet manufacturers’ revenue market shares and demonstrates Apple’s dominant market position relative to other tablet makers. These market share calculations may conservatively understate Apple’s tablet market share for two reasons. First, these calculations include high-end tablets (like those made by Apple) and low-end

<sup>241</sup> “ELOC183 US smartphone rev shares simplified.csv”. Original data source was IDC\_Quarterly\_Mobile\_Phone\_Tracker\_Final\_Historical\_2020Q3\_ModelName.csv, produced as part of Prof. Evans’ 2021-02-16 backup. Chart begins with the year in which the class period began (2015) and ends at the last full year of available data (2019).

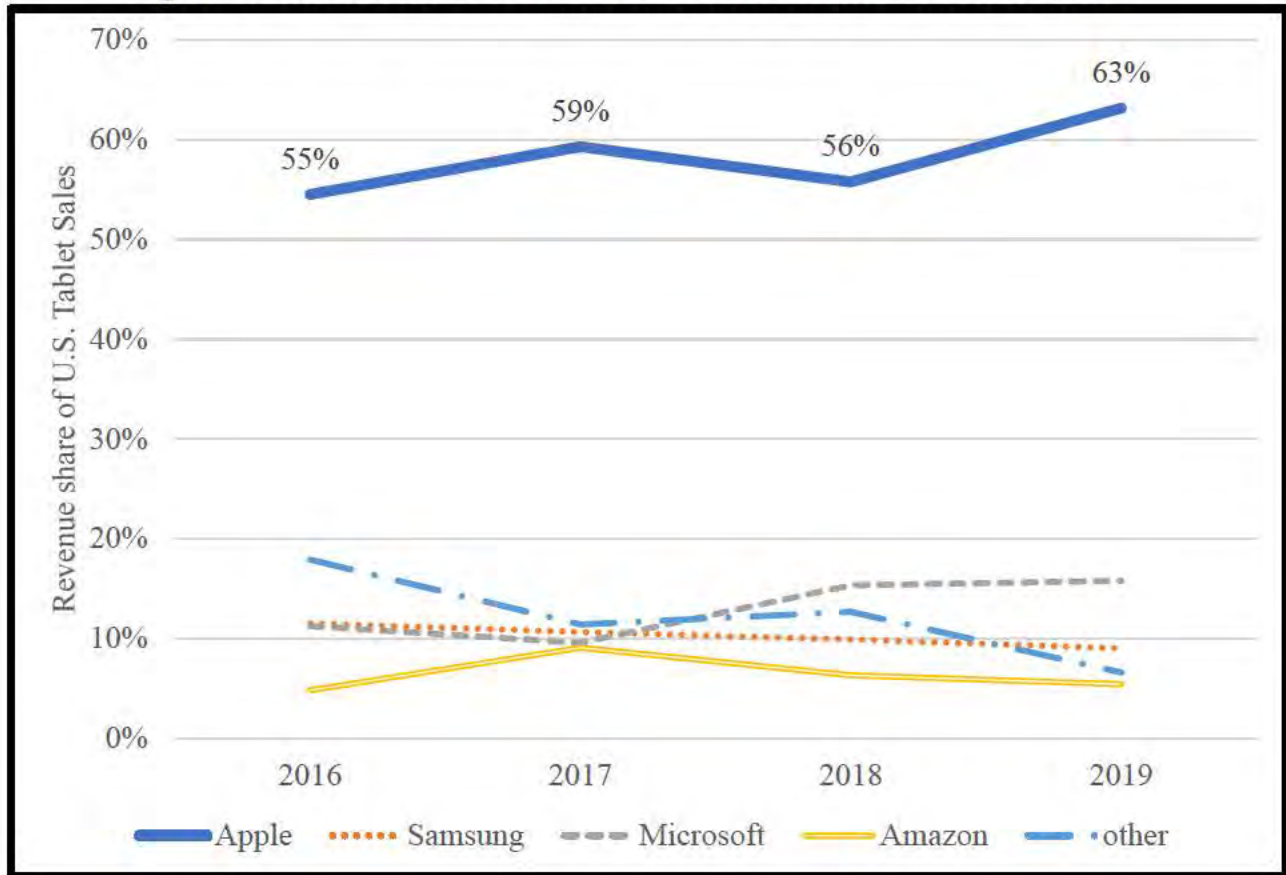
<sup>242</sup> “ELOC185 US tablet revenue shares from IDC.csv”. Original data source was IDC PCD Tracker (Tablet Pivot)\_CMI\_FinalHistoricalDatabase\_2020Q2.xlsx, produced as part of Prof. Evans’ 2021-02-16 backup. Chart begins with the first year of data (2016) and ends on the last full year of available data (2019).



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tablets and thus understate Apple’s market share if the hypothetical monopolist test would support defining the market as high-end tablets. Second, the data source for these market calculations defined tablets to include 2-in-1 laptops with detachable screens, even though their form and function is different than Apple’s tablets. These market calculations thus understate Apple’s market share if the correct definition of the tablet market should exclude 2-in-1 laptops.

**Figure 4: Shares of U.S. Tablet Revenues in the United States<sup>243</sup>**



194. However one calculates market shares, conclusions about Apple’s U.S. market shares in the smartphone and tablet markets are necessarily common to the class. The calculation of those market shares would be the same for all class members, and the evidence and method used to calculate those market shares would be the same for all class members as well.

<sup>243</sup> “ELOC185 US tablet revenue shares from IDC.csv”. Original data source was IDC PCD Tracker (Tablet Pivot)\_CMI\_FinalHistoricalDatabase\_2020Q2.xlsx, produced as part of Prof. Evans’ 2021-02-16 backup. Chart begins with the first year of data (2016) and ends on the last full year of available data (2019).



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***C. Apple Would Have a Dominant Market Share Even in a Broader Market for All App and Digital IAP Distribution Services on Mobile Devices***

195. As discussed in Part I, the correct definition of the market affected by the alleged anticompetitive conduct in this case is iOS app and digital IAP distribution services. In this section, I show that, if one (conservatively but incorrectly) defined a broader market for app and digital IAP distribution services on all mobile devices (i.e., all smartphones and tablets), common evidence would still show that Apple has dominant market shares.

196. As noted in the preceding section, revenue shares are the standard method for measuring market shares, and this measure is particularly advisable here given brand differentiation and market conditions. Apple itself implicitly endorses a revenue share methodology for assessing the importance of different platforms for app distribution because Apple’s executives frequently tout the App Store’s success compared to Google Play based solely on app revenue. For example, Apple stated on a 2014 earnings call that

A recent study by Business Insider Intelligence indicated that iOS has a 5x advantage over Android when it comes to developer revenue per app download, a 4x advantage in revenue from in-app purchases, and a 2x advantage in revenue from paid downloads plus in-app purchases. And according to a recent report from Distimo, the App Store has a 63% to 37% market share advantage over Google Play in global revenue from apps. Top developers continue to launch their apps first, or exclusively, on the App Store.<sup>244</sup>

Tim Cook similarly states on a 2018 earnings call that “based on third party research estimates, the App Store generated nearly twice the revenue of Google Play so far in 2018,”<sup>245</sup> which suggests a share very similar to the one in 2014. Apple’s statements thus indicate that it views its revenue share as an accurate measure of the economic value of its app distribution platform.

197. These same Apple statements indicate that Apple’s revenue market share for all app and digital IAP distribution services on mobile devices was 63% in 2014 and a bit shy of 66% in 2018. Because nearly 100% of smartphones use either iOS or Android, and Google has between a 90% and 100% share of Android app downloads outside of China, these estimates of the share of Apple and Google app store revenue represent very close proxies for market share in the total app

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<sup>244</sup> <https://www.businessinsider.com/apple-is-becoming-a-post-pc-company-2014-1>

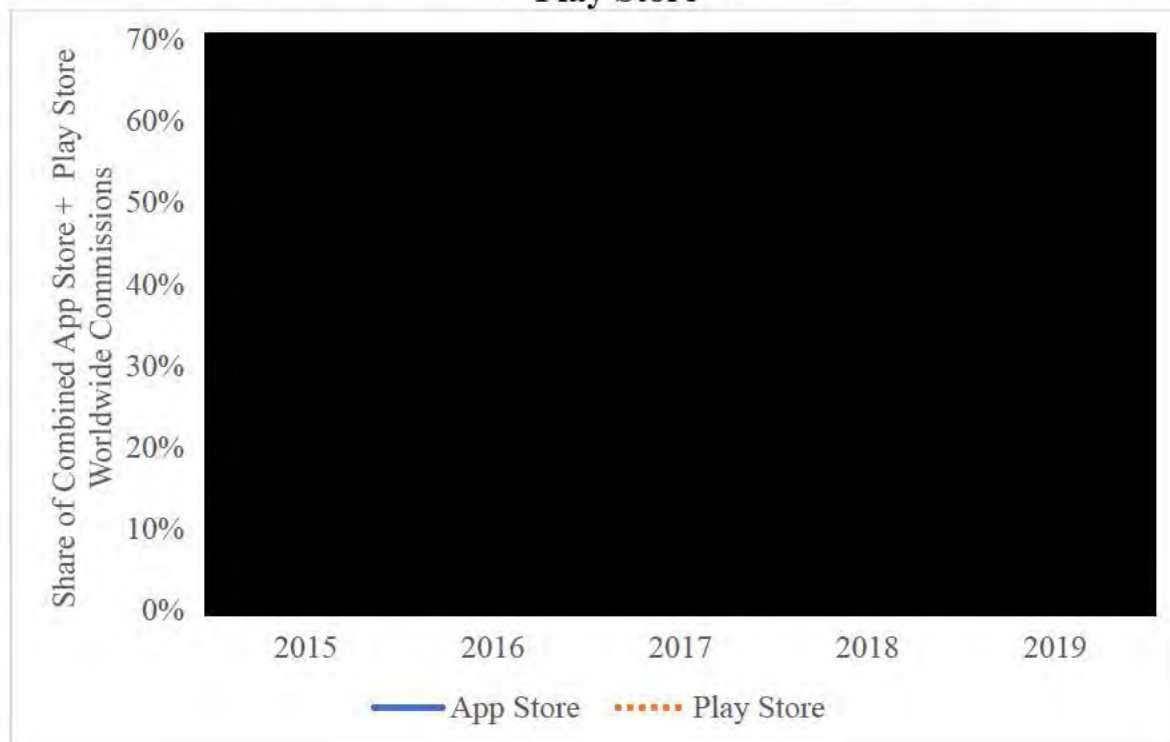
<sup>245</sup> Apple 2018 Q3 Earnings Call Transcript.

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distribution market.<sup>246</sup> These Apple estimates of its revenue share are confirmed by the data produced in this case. Google thus far has produced Play Store commissions data only for the entire world combined.<sup>247</sup> Combining this data with worldwide App Store commission data<sup>248</sup> shows that the App Store has had a [REDACTED] share of the combined worldwide commissions from the App Store and Google Play Store during the class period (see Figure 5 below). These are dominant market shares [REDACTED]

[REDACTED]<sup>249</sup>

**Figure 5: Shares of Worldwide Commissions from the App Store and Google Play Store<sup>250</sup>**



<sup>246</sup> July 18, 2018 European Commission Decision in Case AT.40099 (Google Android), at Table 5. The commission decision redacted the Google Play Store’s exact share, instead reporting Google’s share as “90-100%”.

<sup>247</sup> See GOOG-APPL-00099392 (worldwide Google Play Store commission data, broken down by month, genre, and monetization type).

<sup>248</sup> APL-APPSTORE\_08932378 at APL-APPSTORE\_08932488.

<sup>249</sup> See Part II, Section B.

<sup>250</sup> “ELOC901 play v app store commission shares worldwide.csv.”

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***D. Apple Has Monopoly Power and Market Power in the iOS App Distribution Market***

198. Apple has monopoly power in the market for iOS app and digital IAP distribution services. (This necessarily means Apple also has market power in that market, since monopoly power is a substantial degree of market power.) Three independently sufficient bases confirm Apple’s monopoly power in this market: (1) a high market share (nearly 100%), coupled with high barriers to entry and expansion; (2) direct evidence that Apple has the power to charge supracompetitive prices for iOS app distribution; and (3) direct evidence that Apple has exercised a power to exclude rivals from this market. Further, even if one conservatively defines a broader market that includes app distribution on other mobile device operating systems, Apple still has monopoly power and market power.

***1. High Market Shares Coupled with High Barriers to Entry and Expansion***

199. A high market share indicates that a firm has significant market power when the market also exhibits high barriers to the entry of new rivals and the expansion of existing rivals. Here, Apple has had a near-100% share of the market for iOS app and digital IAP distribution services throughout the class period.<sup>251</sup> This high market share (coupled with high barriers to entry and expansion that were largely created by Apple) indicates market power and monopoly power because it makes it likely that Apple has the power to raise prices. Apple’s high market shares also indicate that: (1) it controls enough of this market to restrain substantial shares; and (2) it will profit from a successful exclusionary scheme more than firms with smaller market shares would.<sup>252</sup> Entry barriers in the market for iOS app and digital IAP distribution services have been high because Apple’s exclusivity restraints have acted as a near total barrier to entry or expansion not only for potential rival app distributors, but also for any developers interested in self-distribution.<sup>253</sup>

200. Even if one (conservatively but incorrectly) defined a broader market that includes app and digital IAP distribution services for other mobile device operating systems, Apple still has a dominant [REDACTED] share.<sup>254</sup> Coupled with high barriers to entry and expansion, this market share is still large enough to indicate monopoly power (and thus necessarily market power). Barriers to entry and

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<sup>251</sup> See *supra* Part II, Section A.

<sup>252</sup> Einer R. Elhauge, *Defining Better Monopolization Standards*, 56 STAN. L. REV. 253, 335 (2003).

<sup>253</sup> See *infra* Part III.

<sup>254</sup> See *supra* Part II, Section C.

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expansion are high because exclusionary restraints to prevent entry and expansion are imposed not only by Apple for any iOS app distribution entrant,<sup>255</sup> but also by Google for any Android app distribution entrant,<sup>256</sup> and virtually all smartphone and tablets use either iOS or Android operating systems.<sup>257</sup> Further, Apple’s dominant market share in this broader market indicates a particularly high level of monopoly power (and market power) because (1) consumers hold their smartphones on average for 2.6 years and while locked in to their current iPhone, cannot switch from an iOS app distributor to a non-iOS distributor; and (2) even when consumers are ready to buy a new smartphone, high switching costs deter the lion’s share of consumers from switching to a device with a different OS and thus prevent them from switching from Apple’s iOS app distribution to any non-iOS app distributor.<sup>258</sup>

201. As noted above, evidence and conclusions on market shares in the market for iOS app and digital IAP distribution services (or any broader market for all app and digital IAP distribution services) are necessarily common to the class because the calculation of those market shares would be the same for all class members, as would be the method and data needed to calculate them. Likewise, the evidence and conclusions on the degree of barriers to entry is common to the class because the degree of those entry barriers is a fact that is the same for all class members. Similarly, conclusions about whether the combination of those market shares and entry barriers support conclusions of market power and monopoly power are necessarily common to the class.

*2. Apple’s Ability to Price Far Above Competitive Levels Demonstrates Its Monopoly Power*

a. Apple’s App Store Profit Margins Greatly Exceed Competitive Levels

202. Apple has exceptionally high profit margins for the App Store, which indicates a very high degree of market power according to the Lerner Index, which

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<sup>255</sup> See *infra* Part III.

<sup>256</sup> See *infra* Appendix A.

<sup>257</sup> From 2016-2020, the combined iOS and Android share of operating systems increased from 99.98% to 100.00% for smartphones and from 97.56% to 99.87% for tablets. See Statcounter GlobalStats US mobile and tablet market shares, available at <https://gs.statcounter.com/os-market-share/tablet/united-states-of-america> and <https://gs.statcounter.com/os-market-share/tablet/united-states-of-america>.

<sup>258</sup> See *infra* Part II, Section E.



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is the “standard measure of profit margin used to assess market power.”<sup>259</sup> The Lerner Index is “defined as the difference between price and marginal cost divided by the price  $(p - MC) / p$ .”<sup>260</sup> I have located several Apple documents showing App Store revenues and costs during the class period. One document reporting the “App Store P&L” for 2019 and 2020 shows that the App Store’s COGS (“cost of goods sold”) is [REDACTED] of revenue.<sup>261</sup> The next category of costs are called OCOGS (“other costs of goods sold”) and includes [REDACTED].<sup>262</sup> The largest such component, “[REDACTED]” is clearly not a marginal cost and represents [REDACTED] of OCOGS in 2019 and [REDACTED] of OCOGS in 2020. To be conservative, I assume that the remaining subcategories of OCOGS are marginal. To the extent some of them in fact consist of fixed costs, this would mean that the actual Lerner Index would be even higher than my conservative estimate here. Finally, OPEX “operating expenses” appear to contain a mix of credit card transaction expenses and general overhead expenses for the overall company allocated to the App Store in proportion to revenues.<sup>263</sup> Such allocations of overhead expenses are recurring fixed costs, while credit card transaction fees are marginal costs.

203. Conservatively including all OCOGS subcategories other than [REDACTED], and including the [REDACTED] of OPEX expenses that relate to credit card fees, I calculate marginal costs as only [REDACTED] of commission revenues in 2019 and [REDACTED] of commission revenues in 2020, which corresponds to Lerner Indexes of [REDACTED] and [REDACTED] respectively.<sup>264</sup> These Lerner Index profit margins are far in excess of not only the 10% that prevails in highly competitive markets, but also the 40-50% that could prevail in reasonably competitive markets.<sup>265</sup>

<sup>259</sup> ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 247 (2d ed. 2014) (“The standard measure of profit margin used to assess market power is the Lerner Index”); *see also* William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 939-40 (1981).

<sup>260</sup> ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 247 (2d ed. 2014).

<sup>261</sup> APL-APPSTORE\_10176241 at APL-APPSTORE\_10176318.

<sup>262</sup> APL-APPSTORE\_10176241 at APL-APPSTORE\_10176318.

<sup>263</sup> APL-APPSTORE\_08856866. Other categories of App Store OPEX are Affiliate Fees (discontinued in 2019 and 2020), Creative Services, Analytics Pro Services, Design, Headcount, Facilities, and Allocations. APL-APPSTORE\_08883133 at APL-APPSTORE\_08883290.

<sup>264</sup> *See* “ELOC App Store Marginal Costs.xlsx”, produced as backup to this report.

<sup>265</sup> ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 247 (2d ed. 2014) (“In a perfectly competitive market, price is driven to marginal cost, making the Lerner Index equal to zero. On the other hand, as firms gain market power, they are able to sustain price above marginal cost,



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204. To be further conservative, I also calculate Apple’s long-run profit margins, which includes not only marginal costs but also recurring fixed costs. This results in lower profit margins than the Lerner Index that is the standard measure of the degree of market power. However, such long-run profit margins can be relevant to determining whether profit margins would be high enough to invite entry absent anticompetitive exclusion. Apple’s long-run profit margins were █████ in 2018, █████ in 2019, and █████ in 2020.<sup>266</sup> The Apple’s average long-run profit margin, weighted by revenue, across all three years, is █████.<sup>267</sup> This is hugely above normal competitive levels, even if one uses as a benchmark the possible reasonably competitive profit margin of 40-50%, which considers only marginal costs.

205. The above enormous profit margins indicate a monopoly power to raise price above competitive levels regardless of how the market is defined. As noted above, the fact that Apple (as a near-100% monopolist in iOS app and IAP distribution services) was able to raise prices so far above competitive levels directly shows that a hypothetical 100% monopolist in in iOS app and IAP distribution services would be able to raise prices by more than 5% above competitive levels, and thus supports defining the market as no broader than in iOS app and IAP distribution services.<sup>268</sup> But even if one rejected that market definition and broadened it to include all app and IAP distribution services, the fact that with over 60% of that broader market, Apple was able to raise prices so far above competitive levels establishes that Apple had the monopoly power to raise prices in that broader market.

206. It is theoretically possible in a two-sided platform that a company could have high profit margins on one side of the platform that are offset by negative margins on the other side, in which case the high margins on the profitable side viewed in isolation would not necessarily be indicative of market power.<sup>269</sup> Here,

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leading to a higher Lerner index. In highly competitive industries, the Lerner index may be around 0.1, whereas in industries that are ‘reasonably’ competitive, the Lerner Index may be 0.4 or 0.5, but there is no defined rule for identifying market power.”).

<sup>266</sup> APL-APPSTORE\_08883133, at 286; APL-APPSTORE\_10176241, at 318.

<sup>267</sup> See “App Store Marginal Costs.xlsx”, produced as backup to this report.

<sup>268</sup> See Part I, Section C.3.

<sup>269</sup> Evans & Noel, Defining Antitrust Markets When Firms Operate Two-Sided Platforms, 2005 Colum. Bus. L. Rev. 667, 696 (2005) (“it is incorrect to conclude, as a matter of economics, that deviations between price and marginal cost on one side indicate that 2SPs are pricing to exploit market power and drive out competition.”); Evans & Schmalensee, The Antitrust Analysis of

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however, Apple charges no fees to the users and App Store costs included in the Lerner Index calculations reflect the costs of serving both sides of the platform. This means that the Lerner Index calculation is in fact a two-sided calculation, rather than a one-sided one, and therefore avoids this theoretical concern.

207. However one the resolves the above issues, the method, evidence, calculations, and conclusions on Apple’s ability to raise prices above competitive levels are necessarily common to the class because they are the same for all class members.

b. Apple Mistakenly Asserts That Decreases Over Time in Its App Store Commissions Show a Lack of Market Power

208. Apple and its experts have argued that Apple’s App Store commission has only stayed the same or gone down over time, which they claim belies any finding of power over price, especially because the 30% commission was instituted at the very outset of the App Store.<sup>270</sup> Professor Schmalensee also claims that because the SDK features available to developers have improved over time, Apple has actually lowered quality-adjusted prices.<sup>271</sup>

209. These arguments by Apple and its experts are not economically sound because the correct economic comparison is not to *past* pricing, but rather to the simultaneous *competitive* level of pricing. If a firm has a huge amount of monopoly power at time 1 and its power is eroding so it has a lot (but somewhat less) monopoly power at time 2, its prices and profit margins may go down over time but it still has monopoly power at each point in time because it always has the power to price significantly above competitive levels. Indeed, most anticompetitive conduct by

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Multisided Platform Businesses, in *The Oxford Handbook of International Antitrust Economics*, Volume 1, 404, 423 (2015) (Roger D. Blair & D. Daniel Sokol, eds.) (“it is theoretically possible and empirically common for platforms to have prices that are significantly above marginal cost on one side and at or below marginal cost on the other side. A platform could have a monopoly in which it earns significantly more than the competitive rate of return yet price at or below marginal cost on one side. Therefore examining price on that side would result in a false negative test result for market power. A platform could also earn a competitive rate of return yet price significantly above marginal cost on one side. Therefore examining price on that side would result in a false positive test result for market power.”).

<sup>270</sup> Schmalensee 2021-02-16 Report in *Epic v. Apple* ¶44.

<sup>271</sup> Schmalensee 2021-02-16 Report in *Epic v. Apple* ¶45.

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monopolists slows down the erosion of their monopoly power, and thus is consistent with declining prices and profit margins.<sup>272</sup>

210. Prof. Schmalensee is also mistaken that any purported improvements in Apple’s iOS SDK (tools developers use to create iOS apps) constitute a relevant decrease in the quality-adjusted price of the App Store. The tools developers use to create apps that run on an operating system are a separate product from app distribution for that operating system.<sup>273</sup> By analogy, when Microsoft improves the SDK that Windows developers can use to create Windows apps, that does not constitute a relevant decrease in the quality-adjusted price of Microsoft’s Windows app distributor (the Microsoft Store) or of any of the other Windows app distributors, such as Steam and the Epic Game Store, that are free to distribute Windows apps.

211. Further, I have not seen evidence that Apple has ever reduced its commission relative to the past *in response to competition*. Apple’s stated goals of providing a relatively lower 15% commission for year-old subscriptions and developers who enroll in the Video Partner Program were to incentivize developers to retain subscribers and integrate their apps into Apple TV.<sup>274</sup> Incentivizing certain business conduct by offering lower prices if certain conditions are met is not at all inconsistent with market power because it does not indicate any competitive constraint on prices. Even a 100% monopolist wants to incentivize business conduct that helps make its product more valuable. Apple’s decision to implement the Small

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<sup>272</sup> Elhauge, *Defining Better Monopolization Standards*, 56 Stanford Law Review 253, 337-339 (2003).

<sup>273</sup> See also *infra* Part III.C (showing that the developer ability to write apps to run on an OS is a separate product from app distribution); *infra* Part VI.B.2.a (showing that improving the development of iOS apps increases Apple profits primarily by increasing sales of iOS devices).

<sup>274</sup> Matt Fischer 1/7/2021 Dep. (Vol 2) at 408:15-20 (“I believe that our video team created our Video Partner Program and had the, you know, the 85/15 split as part of that program *in exchange for a bunch of different features and deliverables* that the developer would need to support specifically supporting the TV app.”) (emphasis added); Lauren Goode, *App Store 2.0* (published June 8<sup>th</sup>, 2016, available at <https://www.theverge.com/2016/6/8/11880730/apple-app-store-subscription-update-phil-schiller-interview>) (quoting Apple executive Phil Schiller as stating that Apple adopted the 15% commission for year-old subscriptions because “ ‘we recognize that developers do a lot of work to retain a customer over time in a subscription model, and we wanted to reward them for that by helping them to keep more of the revenue.’ Apple can help drive customers to the original download, Schiller argues, but only the developer can keep the customer over time and ‘we want to incent them to do that.’”); APL-APPSTORE\_07096778 (VPP program “Participants receive a reduced 15% commission rate .... so long as they: are available on tvOS and iOS with IAP; support Universal Search, TV App, Live/Sports Tune-In, and Single Sign-On on iOS and tvOS, as applicable; support all applicable Universal Services as of the Effective Date of the Addendum”).

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Business Program did not appear to be driven by competition either; Apple’s CEO, Tim Cook, testified the decision was instead driven by the “COVID” crisis and being “very worried about small business,” in addition to “the lawsuits ... in the back of [his] head.”<sup>275</sup> Cutting prices for political or litigation-driven reasons does not show any competitive constraint on prices that would cut against market power. Firms with absolute monopoly power might also make pricing decisions for political or litigation-driven reasons. Indeed, the ability to make pricing decisions on such non-economic grounds itself affirmatively indicates the existence of market power because a competitive market disciplines pricing that is not based on market economics.

c. Apple’s Comparisons to Other Platforms’ Commissions Are Misguided

212. Apple and its experts have also argued that Apple’s standard commission rate is lower than the 70% commission developers pay for brick-and-mortar distribution of games, and that Apple’s commission rate is consistent with other types of digital and non-digital marketplaces today.<sup>276</sup> However, a comparison of standard commissions does not show an absence of market and monopoly power because it does not consider costs and discounts. The comparison to brick-and-mortar distribution is apples-to-oranges because of the significantly higher costs of maintaining physical retail locations and inventories. For app distribution software platforms, the nominal standard commission can be altered by various discounts. For example, Steam charges lower commission rates for higher revenue apps,<sup>277</sup> and

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<sup>275</sup> May 21, 2021 Trial Transcript in Epic v. Apple at 3992 (“THE COURT: The issue with the \$1 million Small Business Program, at least from what I’ve seen so far, that really wasn’t the result of competition. That seemed to be a result of the pressure that you’re feeling from investigations, from lawsuits, not competition. THE WITNESS [Tim Cook]: It was the result—of feeling like we should do something from a COVID point of view, and then electing to, instead of doing something very temporary, just do something permanent. And of course we had those things—the lawsuits and all the rest of the stuff in the back of my head, but the thing that triggered it was we were very worried about small business.”)

<sup>276</sup> Schmalensee 2021-03-15 Report in Epic v. Apple ¶31.

<sup>277</sup> Steam charges a 30% commission for each game’s first \$10M in revenue, a 25% commission for each game’s next \$40M in revenue, and a 20% commission for each game’s remaining revenue. Steam Team, *New Revenue Share Tiers and other updates to the Steam Distribution Agreement* (published November 30, 2018, available at [steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838](https://steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838)) (“Starting from October 1, 2018, . . . when a game makes over \$10 million on Steam, the revenue share for that application will adjust to 75%/25% on earnings beyond \$10M. At \$50 million, the revenue share will adjust to 80%/20% on earnings beyond \$50M. Our hope is this change will reward the positive network effects generated by developers of big games, further aligning their interests with Steam and the community.”)



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Microsoft charges lower commission rates for non-game apps, reducing the overall effective rate charged by these platforms.<sup>278</sup> Some platforms also negotiate discounts individually with developers, such as [REDACTED].<sup>279</sup> Other platforms, such as Steam, also allow content purchased outside of their platform (and therefore not subject to commissions) to be activated via their platforms, thus lowering the effective commission rate.<sup>280</sup> By contrast, Apple does not allow such license keys to be sold outside its app, making its effective commission rate higher than Steam’s. Apple’s experts’ comparisons also fail to take into account any discrepancy in fees other than commission, such as the fact that Apple charges a \$99 per year developer fee, which is much higher than Google’s one-time \$25 developer fee.

213. In fact, it can affirmatively be shown that Apple has higher profit margins than even Google, which as discussed in Appendix A also engages in anticompetitive behavior that inflates its margins above competitive levels. To do an apples-to-apples comparison between Apple and Google, one must use a measure of profit margins that considers COGS and OCOGS, but not OPEX.<sup>281</sup> Since this

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<sup>278</sup> Currently, the Microsoft Store charges a 15% commission for non-game Windows 10 apps and a 30% commission for Windows 10 game apps. Microsoft Store App Developer Agreement, Version 8.6 (available at) §6.b. Microsoft announced in April that it would reduce its commission for Windows 10 game apps to 12% on August 1, 2021. Matt Booty, *Continuing Our PC Gaming Journey in 2021 and Beyond* (published April 29, 2021, available at <https://news.xbox.com/en-us/2021/04/29/continuing-our-pc-gaming-journey-in-2021-and-beyond/>) (“starting on August 1 the developer share of Microsoft Store PC games sales net revenue will increase to 88%, from 70%.”).

<sup>279</sup> [REDACTED]

[REDACTED] Fortnite launched on the Galaxy Store on August 9, 2018. See Andrew Webster & Chris Welch, *Fortnite for Android is launching today exclusively on recent Samsung Galaxy devices* (published August 9, 2018, available at <https://www.theverge.com/2018/8/9/17666316/samsung-galaxy-note-9-fortnite-android-release-unpacked-event-2018>).

<sup>280</sup> “Why Valve actually gets less than 30 percent of Steam game sales”, Kyle Orland, April 4, 2019, Ars Technica, available at <https://arstechnica.com/gaming/2019/04/why-valve-actually-gets-less-than-30-percent-of-steam-game-sales/>.

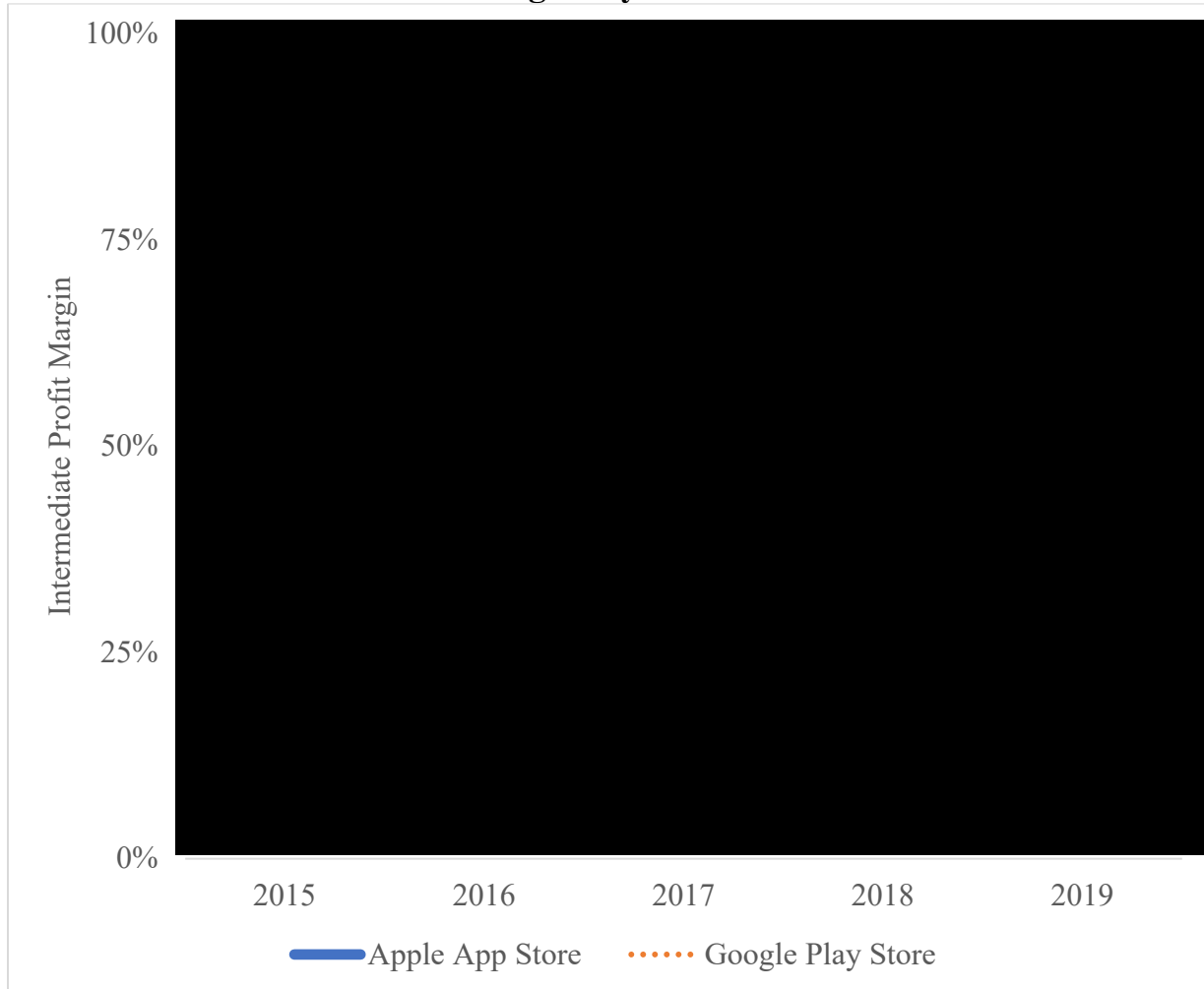
<sup>281</sup> The source for Apple App Store profit margins covering 2015-2020 (APL-APPSTORE\_08856864) does not contain OpEx expenses, and the source for Google Play Store profit margins covering 2015-2020 (GOOG-APP-00100495) does not contain a breakdown of



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measure uses a measure of costs that is in between the costs considered for the above calculations of short-run profit margins and long-run profit margins,<sup>282</sup> I will call it an intermediate profit margin. As shown in Figure 6 below, by this measure, Apple’s profit margins are consistently even higher than the already inflated Google Play Store profit margins, indicating a strong power to price above competitive levels.

**Figure 6: Apple App Store and Google Play Store Intermediate Profit Margins by Year<sup>283</sup>**



expense categories included within COGS and OpEx that would allow for an isolation of marginal costs

<sup>282</sup> See *supra* Part II.D.2.a.

<sup>283</sup> “ELOC Play Store v App Store Intermediate Profit Margins.xlsx”, based on GOOG-APP-00100495 and APP-APPSTORE\_08856864.

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*3. Apple’s Ability to Exclude Rival Apps Demonstrates Its Power*

214. Evidence that a firm has been able to successfully exclude rivals directly proves that the firm has market power because only firms with market power can profitably exclude rivals. Here, Apple has demonstrated that it has the power to completely exclude virtually all competition from the market for iOS app and digital IAP distribution services. As discussed in Part III, Apple’s restraints foreclosed 100% of the market for iOS app and digital IAP distribution services. This foreclosure has successfully prevented all meaningful competition for iOS app and digital IAP distribution services. Further, given that Apple had more than a [REDACTED] share in the (conservatively but incorrectly) defined broader market for app and digital IAP distribution services on all mobile and tablet devices,<sup>284</sup> this necessarily means that Apple’s restraints alone foreclosed more than [REDACTED] of that even broader market.

215. In addition to its complete power to exclude rival app stores, there is evidence that Apple has been able to exclude rival apps on iOS by deprioritizing competing apps. One notable example occurred when Apple removed rival screen time and parental control apps prior to launching and promoting its own such app.<sup>285</sup> If Apple did not possess market power in iOS app distribution, then rival apps could simply distribute their apps on competing app stores, and Apple’s exclusion of rival apps would not succeed. A similar practice harmful to developers that would not succeed if Apple did not have market power in the iOS app distribution market is “Sherlocking”<sup>286</sup>, whereby Apple copies popular app features and implements them in its own apps, for which it can provide pre-installation or prioritized distribution. A 2019 article following Apple’s WWDC noted that Apple copied at least 9 new apps that year and that “[w]hile not every single [original rival app] will be considered dead by the time Apple rolls out iOS 13 and macOS Catalina in the fall, at the very least these developers must now figure out ways to differentiate themselves enough to keep customers from switching to Apple’s version.”<sup>287</sup> If an

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<sup>284</sup> See *supra* Part II, Section C.

<sup>285</sup> “Apple is under scrutiny for squashing competitors on the App Store – again.” Emily Stewart, April 29, 2019, Vox, available at <https://www.vox.com/2019/4/29/18522639/apple-screen-time-parental-control-apps-nyt>

<sup>286</sup> “What does it mean when Apple ‘Sherlocks’ an App?”, Justin Pot, March 14, 2017, available at <https://www.howtogeek.com/297651/what-does-it-mean-when-a-company-sherlocks-an-app/>.

<sup>287</sup> “9 apps and products Apple copied for iOS 13 and macOS Catalina”, Natt Garun, June 4, 2019, The Verge, available at <https://www.theverge.com/2019/6/4/18651190/apple-ios-13-mac-os-catalina-third-party-apps-products-copy-wwdc-2019>.

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app store that did not possess market power made a habit of copying popular app features and then prioritizing distribution of its copied version of these apps, developers would cease distributing through that app store, making it an unprofitable strategy for an app store without market power.

***E. Analyzing iOS App Distribution as an Aftermarket Does Not Reduce Apple’s Market Power***

216. Apple’s experts have argued that its market power in the secondary iOS app distribution market is constrained by competition in the primary market for mobile devices like smartphones and tablets.<sup>288</sup> Although competition in a primary market can *theoretically* constrain market power in a secondary market, evidence common to the class indicates that competition in the primary mobile device market does not significantly constrain Apple’s market power in the secondary iOS app distribution market.

217. Apple’s experts acknowledge that developers do not participate in the primary market, but simply assert that as a result “competition in the foremarket [primary market] cannot be evaluated.”<sup>289</sup> The actual import of this fact is that developers are unable to defeat supracompetitive pricing in the secondary market by switching to another provider in the primary market because they do not make the decisions in that primary market. For developers to theoretically have any impact on the primary market, they would have to induce users to switch operating system platforms by changing which platform they develop applications for, making iOS less attractive for users.

218. As even Apple’s expert acknowledges, there are a number of conditions that can cause competition in the primary market to be unable to adequately constrain supracompetitive pricing in the secondary market. Apple’s expert argues that

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<sup>288</sup> Apple’s expert Prof. Hitt has argued that the iOS app distribution is not a properly defined “aftermarket,” which is functionally identical to arguing that competition in the primary market prevents the existence of market power in the aftermarket. *See* Hitt Decl. ISO Apple Opp. to Epic Motion for Prelim. Inj (2020-09-15) ¶43 [hereinafter 2020-09-15 Hitt Decl.] (“Note that most consumers’ ability to play Fortnite on platforms other than iOS, purchase V-Bucks on other platforms, and transfer V-Bucks between platforms indicate that iOS app distribution is not a relevant aftermarket, as Epic claims.”); *id.* (“It also appears that the elements present in establishing aftermarket power are not present here”).

<sup>289</sup> Lafontaine Reply Report in *Epic v. Apple* ¶135.

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significant competition in a primary market will constrain a firm’s market power in the secondary market only if the following three conditions are all met:<sup>290</sup>

- (a) Robust competition in the foremarket;
- (b) Customer ability to gather sufficient information about, and therefore unable to account for, aftermarket terms and costs before making their foremarket purchase; and
- (c) Customers are not being locked into the primary market

Apple argues that if these conditions are all met, “firms compete over life-cycle prices and lock-in effects do not convey the ability to exercise market power.”<sup>291</sup> But in fact none of these three conditions are met, as detailed below.

### *1. Competition in the Foremarkets Has Not Been Robust*

219. Competition has not been robust in the foremarkets for smartphones and tablets because Apple has had strong market power in those device markets. This Apple market power in those device markets can be established by (1) high market shares and entry barriers; (2) direct evidence of a power to charge supracompetitive prices; or (3) direct power of a power to exclude. Whatever conclusions one draws about any of these issues, the conclusions and evidence and method used to reach them would be the same for all class members and thus common to the class.

#### a. High Market Shares and Entry Barriers

220. As discussed in Part II.B, Apple has possessed a dominant and increasing market share in the foremarkets for smartphone and tablet devices. This dominant and increasing market share has been combined with significant barriers to entry and expansion in U.S. smartphone and tablet markets. The biggest barriers are: (1) intellectual property; (2) research and development costs; and (3) economies of scale; and (4) operating system switching costs. One of Apple’s experts in the related *Epic v. Apple* litigation acknowledged that Apple uses “its IP as a tool to prevent competitors from either copying existing technologies or bringing Apple’s ‘original’ ideas to fruition first.”<sup>292</sup> Potential rivals must invent around this intellectual property, and researching and developing new technology in this industry is incredibly expensive; as evinced by Apple spending over \$18 billion in R&D in just the last fiscal year.<sup>293</sup> Even if a rival successfully invents around Apple

<sup>290</sup> Lafontaine Report in *Epic v. Apple* (Feb. 16, 2021) ¶70.

<sup>291</sup> Lafontaine Report in *Epic v. Apple* (Feb. 16, 2021) ¶71.

<sup>292</sup> 2021-02-16 Malackowski report in *Epic v. Apple* ¶69.

<sup>293</sup> 2021-02-16 Malackowski report in *Epic v. Apple* Figure 1.

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(and other smartphone manufacturers’) patents, it would have to overcome Apple’s economies of scale advantage from purchasing smartphone components in enormous quantities.<sup>294</sup> These high entry barriers are confirmed by the fact that no smartphone or tablet entered the market without using an iOS or Android OS from 2016-2020.<sup>295</sup> Further, Apple’s market power in the smartphone and tablet markets is enhanced by the fact that high switching costs deter the lion’s share of consumers from switching to a rival smartphones and tablets that use a different OS.<sup>296</sup>

b. Direct Evidence of Power Over Price

221. In addition, Apple has had significant pricing power in the smartphone and tablet markets, as demonstrated by its large margins. Figure 7 below shows that Apple has consistently maintained high profit margins on its sales of iOS devices.

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<sup>294</sup> Miguel Helft, *Will Apple’s Culture Hurt the iPhone* (published October 17, 2010, available at <https://www.nytimes.com/2010/10/18/technology/18apple.html?src=busln>) (“ And because it is one of the largest purchasers of Flash memory, which is one of the most expensive components of a smartphone, it has ‘enormous economies of scale,’ Professor Yoffie said.”).

<sup>295</sup> See Statcounter GlobalStats US mobile and tablet market shares, available at <https://gs.statcounter.com/os-market-share/tablet/united-states-of-america> and <https://gs.statcounter.com/os-market-share/tablet/united-states-of-america>.

<sup>296</sup> See *infra* Part II, Section E.3.



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**Figure 7: Apple Profit Margin on U.S. Sales of iOS Devices<sup>297</sup>**

222. Although (as discussed above) profit margins of 40-50% could be reasonably competitive in some markets, in this market the competitive profit margin is far lower, as evidenced by the far lower profit margin of Apple’s competitors in this market. Many other device makers have negative profit margins, and even the most successful of Apple’s competitors in the device market, [REDACTED]

[REDACTED]

<sup>297</sup> “ELOC322 apple profit margins by device type year wide.csv”. Profit margins are calculated using Apple device sales data contained in APLAPPSTORE08822222.xlsx, which includes “Revenue” and “STD COST” (Standard Cost) data. Profit margin calculated as (revenue – standard cost)/(revenue).

<sup>298</sup> GOOG-APPL-00111712 at GOOG-APPL-00111730 (August 2019 “Android Ecosystem Update” presentation):

<sup>299</sup> *Id.*

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c. Direct Evidence of a Power to Exclude

223. Evidence that a firm has been able to successfully exclude rivals via tying directly confirms that the firm has tying market power. As detailed above in Part II.A and below in Part III.C, Apple’s requirements tie has excluded all meaningful rivals in the iOS app distribution market, leaving only a trivial share for the few distributors who were willing and able to both violate Apple’s contractual conditions and circumvent Apple’s technological restraints. Moreover, for reasons explained in Part III, Apple’s requirements tie excluded competition from [REDACTED] of even an incorrectly defined broader market for app distribution on any mobile device.

*2. Consumers Are Unable to Fully Account for App Terms and Pricing Prior to Purchasing a Device*

224. In this case, it would be exceptionally difficult for consumers to attempt to analyze the expected lifecycle costs of apps and in-app purchases they might wish to purchase over the lifetime of the device they purchase, because they do not know which apps they might wish to purchase over the lifetime of the device and what quantity of in-app purchases they will wish to purchase. Indeed, many apps or IAPs that they may eventually purchase for use on the device may not even have existed at the time the consumer made the purchase. The average person holds on to their smartphone for 2.6 years,<sup>301</sup> and during the first 2.6 years of the class period, 29% of consumer spending was on apps that were released after the class period began.<sup>302</sup> Accordingly, a significant amount of app spending occurs on apps that did not even exist at the time the device was purchased.

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<sup>300</sup> *Id.*

<sup>301</sup> Chris Holmes, *This is How Long You’ll Probably Keep Your New iPhone* (published October 26, 2018, available at <https://www.whistleout.com/CellPhones/Guides/this-is-how-long-youll-keep-iphone>).

<sup>302</sup> “ELOC837 pct of consumer spending on apps during the first 2.6 years of the class period from new apps.txt”.



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225. Even if consumers did have foresight into which app transactions they would like to make over the course of their device lifetime, calculating the total price of these transactions and comparing them to the total price of such transactions on other platforms would be a time-consuming exercise. Unlike in the franchisor context to which Apple’s expert analogizes,<sup>303</sup> the costs of app transactions over the expected life of the primary market transaction are low and unpredictable. The costs are also very heterogeneous as they depend on specifically which apps each consumer would like to purchase in the future, meaning that research regarding overall transaction costs for other consumers would be of little practical relevance to each individual consumer. For these reasons it would not be worth most consumers’ time to even attempt to perform such a life-cycle cost calculation, given the average amount of money spent on apps and in-app purchases for each consumer over the lifetime of the device is low, both in comparison to the value of the average consumer’s time, and to the upfront cost of the device.<sup>304</sup> Of course, the inflated costs of iOS app and IAP distribution services are material to developers, but they are not the ones in the position to make a decision as to what operating system consumers should join based on a lifecycle cost calculation.

*3. Consumers Are Sufficiently Locked In to Their Devices to Deter Developer Efforts to Switch Them to a Platform with Less Restrictive Contracts and Lower Prices*

226. From the perspective of developers, consumers are also significantly locked into their preferred operating system platform. In order for Apple’s theory that competition in the primary market could constrain prices in the iOS app distribution market to apply, developers would have to find that users were not in fact locked in to their operating system platform of choice, but rather that they would be willing to switch operating system platforms in order to buy from a more competitive source for app and IAP distribution services. This is not the case for several reasons.

227. First, consumers do not continuously decide which device operating system platform they wish to use, but rather purchase new smartphone every 2.6

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<sup>303</sup> Lafontaine Report (Feb. 16, 2021) ¶66.

<sup>304</sup> See *infra* Part II.E.3. Indeed, [REDACTED] of consumers had zero spending on the App Store during the class period, indicating that the typical user behaves quite differently from the users who actually drive revenue, and that the prospect of lower app pricing would not be able to induce the majority of users to switch device operating systems. “ELOC736 pct of consumers contributing to app store commission.csv.”

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years.<sup>305</sup> If a developer created an app for a competing operating system platform, and hoped to convert users to that operating system platform in order to use their app with the promise of better quality or lower prices, the developer would have to wait years for all interested current iOS device users to switch platforms. This would not be a profitable strategy for an app developer given that [REDACTED] of app spending occurs within the first two years of app launch.<sup>306</sup>

228. I reviewed the 30 developers with the highest revenue from iOS app transactions during the class period, and I found that four of them had parent companies that were public and had a policy of capitalizing content development costs.<sup>307</sup> They all amortize their costs over a relatively short period, ranging from six months to four years. Activision Blizzard, the parent company of King.com, the developer with the highest revenue from iOS app transactions during the class period, amortizes its software development costs “based on the ratio of current revenues to total projected revenues for the specific product, generally resulting in an amortization period of six months to approximately two years.”<sup>308</sup> Aristocrat Leisure, the parent company of Big Fish Games and Product Madness, two of the 30 highest revenue apps, amortizes product development costs over a time period of “up to 4 years”.<sup>309</sup> Netflix, another top revenue developer, amortizes over 90% of its content costs “within four years after its first month of availability”.<sup>310</sup> Scientific Games, parent company of Phantom EFX, Inc., another top revenue developer, amortizes “over the estimated economic life, which is typically two to four years.”<sup>311</sup> Even within this time period, some developers amortize relatively more of their costs

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<sup>305</sup> See <https://www.whistleout.com/CellPhones/Guides/this-is-how-long-youll-keep-iphone>.

<sup>306</sup> “ELOC836 average percentage of app royalties within the first 2 years of release, by release year.csv”.

<sup>307</sup> “ELOC Top iOS developers by revenue amortization policies.xlsx”.

<sup>308</sup> Activision Blizzard 2020 Annual Report at p53, available at <https://investor.activision.com/static-files/09bb50e3-b2e8-4407-9ee3-2aec3c7bc29d>

<sup>309</sup> Aristocrat Leisure 2020 Annual Report at p73, available at <https://ir.aristocrat.com/static-files/ac4272d7-e624-4ca7-8396-39792c2b365b>.

<sup>310</sup> Netflix 2020 Annual Report at p30, available at [https://s22.q4cdn.com/959853165/files/doc\\_financials/2020/ar/8f311d9b-787d-45db-a6ea-38335ede9d47.pdf](https://s22.q4cdn.com/959853165/files/doc_financials/2020/ar/8f311d9b-787d-45db-a6ea-38335ede9d47.pdf) (“The amortization is on an accelerated basis, as we typically expect more upfront viewing, for instance due to additional merchandising and marketing efforts, and film amortization is more accelerated than TV series amortization. On average, over 90% of a licensed or produced content asset is expected to be amortized within four years after its month of first availability.”)

<sup>311</sup> Scientific Games 2020 Annual Report at p122, available at <https://scientificgames.gcs-web.com/static-files/3978777d-ad15-4013-9b1e-748f099a06e5>.



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over the first months since product release, to better match amortization of expenses to the timing of when revenues from the product launch are expected to occur.<sup>312</sup> This frontloaded timing of revenue relative to launch date is confirmed in the data that shows that over [REDACTED] of app royalties are received within the first two years of product launch.<sup>313</sup> This mismatch between the frequency with which consumers replace devices and the window during which app developers expect to make the majority of their revenues means that is not profitable for developers to pursue a strategy of converting users to a different operating system platform. Instead, a profit-maximizing developer has to simply take users as they are, and assume they will remain locked into their current choice of operating system platform when making decisions as to which platforms to develop their content for.

229. Second, even when consumers upgrade their devices and therefore have an opportunity to switch operating system platforms, most choose not to as a result of significant platform switching costs. Surveys consistently show that [REDACTED] of consumers do not change operating systems when they purchase a new mobile device.<sup>314</sup> Each of the two largest competitors in the device operating system

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<sup>312</sup> See e.g. Paradox Interactive Interim Report January – September 2020, available at <https://www.paradoxinteractive.com/investors/financial-reports/interim-report-january-september-2020> (PC, mobile, and console game developer discussing the 18-month amortization schedule for development costs and explaining the reasoning behind shifting to a more front-loaded amortization schedule to better match development expenses with the time when revenue from the associated app is expected to occur: “For the games we have launched so far, we have applied a linear amortisation model through which equal amortisation is made in each of the 18 months. For Crusader Kings III, we are instead applying a degressive amortisation model, where we have written off 1/3 of the game's development costs already during the game's launch month, 1/3 evenly distributed during months 2-6, and 1/3 evenly distributed during months 7-18 after the game's launch. This more forward-leaning amortisation model is more in line with how we expect revenue from Crusader Kings III, and similar games we plan to launch in the future, to be distributed.”).

<sup>313</sup> “ELOC836 average percentage of app royalties within the first 2 years of release, by release year.csv”.

<sup>314</sup> Consumer Intelligence Research Partners, “Apple, Google MUST Collaborate on COVID-19 App,” April 10, 2020, at p. 2, <https://files.constantcontact.com/150f9af2201/22099883-2dfc-4f20-a5a0-13889875ccd6.pdf>. (“For the past four or so years, around 90% of new mobile phone activations stayed with the buyer’s previous operating system.”); GOOG-APPL-00003609 at 614, 637 (Google survey finding that [REDACTED] of smartphone users that purchased a new phone did not switch operating systems); *iPhone vs. Android – Cell Phone Brand Loyalty Survey 2019*, SELLCELL (Aug. 20, 2019), <https://www.sellcell.com/blog/iphone-vs-android-cell-phone-brand-loyalty-survey-2019/> (“over 90% [of iPhone users] intend to buy another iPhone when they next upgrade); MORNINGSTAR

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platform market, Apple and Google, have a suite of apps designed to work most seamlessly with each other. Consumers spend time getting accustomed to the suite of apps that they currently use for their device and are hesitant to switch to a whole new suite of apps and invest the time in developing familiarity with them. In addition, Apple has some proprietary apps such as iMessage and Facetime, which cannot be used on an Android device. Since these are social apps used to message and call friends and family members, switching requires one to either accept messaging friends and family who use these apps less often, or convince them all to switch to another messaging or video calling app. Further, some apps and data, such as iTunes-purchased movies and TV shows,<sup>315</sup> cannot be switched from iOS devices to Android devices. Given the consequences, it is no surprise that consumers rarely elect to switch operating systems. In fact, the New York Times’ guide to which type of phone to purchase, “iPhone vs. Android: Which is Better for You?” ultimately recommends simply sticking with whichever platform you already use even “[i]f you’re frustrated by aspects of your current phone.”<sup>316</sup> The reason for this recommendation is simple: “By the time you’ve used a phone for a couple of years, you’ve spent a lot of time learning its quirks, and you’ve probably invested a decent amount of money into apps, games, music, or videos that you may have to rebuy if you switch.”<sup>317</sup> The same article also notes that switching away from iOS is harder than switching away from other devices, specifically because “Apple makes it difficult to use iCloud services or access your media on non-Apple devices.” Empirically we also see that switching platforms is very rare.<sup>318</sup>

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EQUITY ANALYST REPORT, APPLE INC. 2 (Aug. 6, 2020) (“Recent survey data shows that iPhone customers are not even contemplating switching brands today. In a December 2018 survey by Kantar, 90% of U.S.-based iPhone users said they planned to remain loyal to future Apple devices.”); Press Release, Consumer Intel. Research Partners, LLC, Mobile Operating System Loyalty: High and Steady, (Mar. 8, 2018), <http://files.constantcontact.com/150f9af2201/4bca9a19-a8b0-46bd-95bd-85740ff3fb5d.pdf> (“Android loyalty was 89-91%, while iOS loyalty was 85-88%”).

<sup>315</sup> See APL-APPSTORE\_06492312.

<sup>316</sup> Andrew Cunningham, “iPhone vs. Android: Which is Better for You?”, New York Times, last updated January 27, 2021, available at <https://www.nytimes.com/wirecutter/reviews/ios-vs-android/>.

<sup>317</sup> *Id.*

<sup>318</sup> Consumer Intelligence Research Partners, “Apple, Google MUST Collaborate on COVID-19 App,” April 10, 2020, at p. 2, <https://files.constantcontact.com/150f9af2201/22099883-2dfc-4f20-a5a0-13889875ccd6.pdf>. (“For the past four or so years, around 90% of new mobile phone activations stayed with the buyer’s previous operating system.”); GOOG-APPL-00003609 at 614, 637 (Google survey finding that [REDACTED] of smartphone users that purchased a new phone did not switch operating systems);



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230. Comparing estimates of these switching costs to the potential benefits of avoiding supracompetitive prices on app and IAP distribution services shows why the latter would not induce the lion’s share of consumers to switch device OSs, and thus why competition among device OSs does not constrain supracompetitive pricing on the distribution of iOS app and IAP distribution services. A Goldman Sachs study found that switching from iPhone to Android not only cost \$79.95 in direct monetary outlays, but also took a significant amount of time over three weeks, and resulted in the loss of 13% of apps and 100% of iTunes-purchased movies and TV shows.<sup>319</sup> They found these conclusions to be consistent with their findings that “US iPad and iPhone users required an average device discount of 49% to switch platforms.”<sup>320</sup> Given that the average smartphone price was \$282-\$317 from 2016-2021,<sup>321</sup> that means the typical user would require a discount of \$138.18 to \$155.33 to overcome the costs of switching from an iPhone to an Android device.

231. To estimate the benefits of switching to avoid anticompetitive pricing in app or IAP distribution services, consider the following. For the 4.33 year period from the beginning of the class period (June 4, 2015) to the end of Apple’s current transactional data (September 2019), [REDACTED] of App Store consumers spent \$0 on the Apple iOS app stores and [REDACTED] percent of consumers spent \$30.93 or less.<sup>322</sup> Given that the average person holds on to their smartphone for 2.6 years,<sup>323</sup> this means that [REDACTED] percent of consumers spent \$0 and [REDACTED] percent of consumers spent \$18.58 or less on iOS apps per the average device life.<sup>324</sup> Apple’s average app distribution commission was 28.4%,<sup>325</sup> so the total Apple commission per device life would be 28.4% of at most \$18.58 for [REDACTED] percent of iOS device users, which comes to \$5.28 per device life. Even if we conservatively use this monopoly commission level as our baseline, a 5% price increase in commissions would (even if we unrealistically

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<sup>319</sup> See APL-APPSTORE\_06492312.

<sup>320</sup> *Id.* at 3.

<sup>321</sup> <https://www.statista.com/statistics/788557/global-average-selling-price-smartphones/>.

<sup>322</sup> “ELOC862 consumer spending summary, from start of class period to Sep 2019.csv”; “ELOC736 pct of consumers contributing to app store commission.csv”. Apple produced a variable named “person\_id” that uniquely identifies consumer Apple accounts. This statistic may understate the total number of iOS device owners during the class period if some users did not make any transactions on the App Store (including free ones) during the class period.

<sup>323</sup> Chris Holmes, *This is How Long You’ll Probably Keep Your New iPhone* (published October 26, 2018, available at <https://www.whistleout.com/CellPhones/Guides/this-is-how-long-youll-keep-iphone>).

<sup>324</sup> [REDACTED]

<sup>325</sup> See *supra* note 94.

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thought they would be 100% passed through to consumers) raise prices by at most 26 cents for [REDACTED] percent of customers. Twenty-six cents is vastly less than the \$138.18 to \$155.33 needed to overcome the costs of switching from an iOS device to an Android device. Thus, competition in the device market could not possibly prevent the exploitation of monopoly power in the “aftermarket” for iOS app and IAP distribution services.

232. Third, developers seeking a less restrictive platform with lower distribution costs face a collective action problem for any attempt to induce consumers to switch platforms. Because consumers use many different applications for many different purposes, they are unlikely to switch devices based on the availability or lack thereof of a single application, even if they were already thinking about replacing their device and were willing to switch platforms and bear the switching costs involved in doing so. Even the developer with the largest proportion of app transaction revenues during the class period accounted for only [REDACTED] of overall app transaction revenues.<sup>326</sup> This means that even a powerful developer that was able to induce some users to switch to a less restrictive platform that charges all developers a lower distribution fee would find it irrational to pursue such a strategy, because the vast majority [REDACTED] of the benefits would flow to other developers. Because the expected product revenue windows for each developer vary, and the potential switching opportunities for each user also vary, there is no time period during which developers could possibly coordinate a campaign to induce users to switch to a lower-app-cost platform. Absent such coordination, it remains rational for each developer to assume that users will remain with their current platform, regardless of app quality and pricing, and to simply pay the supracompetitive commission that Apple charges developers for access to iOS device users.

### III. APPLE EXCLUDED COMPETITION FROM THE IOS APP DISTRIBUTION MARKET

233. Apple has foreclosed the iOS app distribution market by using a combination of contractual and technological exclusivity restraints that allow developers to sell native iOS apps to third parties only through Apple’s own iOS app stores (the App Store, Apple Business Manager, and Apple School Manager). Forcing consumers and developers to use the Apple’s iOS app stores for the sale of native iOS apps has also forced users and developers to use Apple’s IAP mechanism

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<sup>326</sup> “ELOC815 top iOS developers by revenue.csv”



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for digital IAPs in order to satisfy Apple’s app review and be approved for distribution via Apple’s iOS app stores.<sup>327</sup>

234. Apple’s exclusivity restraints have thus foreclosed 100% of the domestic iOS app distribution market. Even if one incorrectly defined a broader market for app distribution on any mobile device, Apple’s exclusivity restraints foreclosed [REDACTED] of that broader market, given that its market share in that broader market is [REDACTED] and it forecloses all the app distribution that it provides.<sup>328</sup>

235. Section A below explains that Apple does not appear to dispute the general point that it restrains developers from distributing native iOS apps to third parties outside of Apple’s iOS app stores. Nor does Apple dispute that it extends this exclusivity restraint to digital IAP transactions after the initial distribution because apps distributed through Apple’s iOS app stores must use Apple’s APIs for in-app purchases of digital products. Rather than disputing the existence of this exclusivity restraint, Apple argues that this exclusivity restraint is procompetitive.

236. Section B provides a more detailed view of precisely how Apple restrains developers from distributing native iOS apps to third parties outside of Apple’s iOS app stores. It describes all eight ways a developer can install an iOS app, including not only through the App Store, but also via customized Apple app stores limited to users at particular businesses or schools (Apple Business/School

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<sup>327</sup> My conclusion that Apple’s exclusivity restraints extend both to initial iOS app distribution and to the use of IAP mechanisms within iOS apps does not depend on whether or not those are separate products. *See supra* Part I, Section D (not taking a position on whether they are separate products or one single product). If they are a single product, then the restraints that Apple uses to make sure that the iOS apps that it distributes can use only Apple’s IAP mechanisms (including the anti-steering restraints that Apple uses to reinforce those restraints) explain how Apple forecloses both parts of that single market. That foreclosure of all of a single product market would anticompetitively restrain developers from either (1) distributing apps via rival iOS distributors who could offer their own rival single product that combines initial iOS app distribution and IAP mechanisms for the apps they distribute or (b) offering that single product themselves by distributing apps directly to consumers and selling IAPs directly to consumers within those apps. If they are separate products, then those restraints would also constitute a tie of those separate products (reinforced by Apple’s anti-steering restraints), but the anticompetitive effects would remain the same because, while that tie would foreclose only that tied product of IAP mechanisms in iOS apps, other Apple exclusivity restraints foreclose the tying product of initial iOS app distribution. Apple strengthened its ability to foreclose both iOS app distribution and IAP mechanisms with iOS apps (whether or not they are a single product or separate products) through a quite distinct tie of those exclusivity restraints to Apple’s iOS devices. *See infra* Part III, Section C.

<sup>328</sup> *See supra* Part II.C.

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Manager), via methods that do not allow app sales (TestFlight, Ad Hoc distribution, Enterprise Distribution, and Free Xcode provisioning), and via unauthorized app stores on jailbroken iOS devices (which would require both users and developers to violate their agreements with Apple). The result is that Apple’s restraints foreclose 100% of the iOS app distribution market, even though firms violating some of those restraints have been able to engage in some minor distribution of iOS apps. Below in Section B, I explain why none of these alternative installation methods has constrained Apple’s ability to charge supracompetitive commissions for iOS app distribution.

237. Section C explains that Apple has increased its ability to impose these exclusivity restraints by tying them (for device purchasers) to the purchase of iOS devices and (for developers) to the right to run their apps on iOS devices.

238. Whether or not one agrees with my conclusions on the above issues, they involve issues that are common to the class because they involve the existence of a marketwide foreclosure share that has been generated by exclusivity restraints that applied to all class members. None of the evidence on which I rely for my conclusions in this Part is specific to any individual class member, and separate individual actions would have to duplicate the same factual inquiry since it is the marketwide foreclosure share that generates the relevant anticompetitive effects.

***A. Apple Acknowledges That It Restrains Rival Native iOS App Distributors and Direct Distribution***

239. Apple does not appear to dispute that it restrains developers from distributing native iOS apps to third parties outside of Apple’s iOS app stores. Senior Apple executives have repeatedly testified that the App Store is the only way for retail consumers to install native iOS apps on iOS devices.<sup>329</sup> Similarly, former

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<sup>329</sup> Deposition of C.K. Haun (Apple’s Senior Director for Technical Services) at 51-52 (“Q: ... today Apple limits a customer’s ability to choose to download an application directly from a developer, correct? An iOS application. A: iOS applications are provided to our retail customers through the iOS App Store. . . . iOS applications are provided to customers through the iPhone, iOS App Store. There is no other methodology available.”); Deposition of Ron Okamoto (former Apple head of Developer Relations) at 73 (“A: [Apple] created a platform and the platform we created is to allow ... developers in the first place, to be able to create native apps for the iPhone and consumers to be able to get them and put them to their devices through the App Store.”); Deposition of Philip Schiller (Apple executive in charge of the App Store) at 241 (“A: Other than the few examples we talked about with programming and enterprise, there are not other ways to



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Apple CEO Steve Jobs said in 2008, when introducing the App Store, that “the App Store is going to be the exclusive way to distribute iPhone applications.”<sup>330</sup> Apple’s economic experts likewise acknowledge that Apple uses a combination of contractual and technological exclusivity restraints to prevent developers from distributing native iOS apps to third parties outside the App Store.<sup>331</sup>

240. Instead of disputing the existence of the exclusivity restraints, Apple’s economic experts argue that the restraints are procompetitive. Prof. Rubinfeld, for example, argues that consumers and developers would be worse off if Apple faced competition from rival iOS app distributors (or “rogue app stores,” as he calls them) based on the premise that some rivals might fail to detect a malicious apps as well as Apple does.<sup>332</sup> I address Apple’s arguments that its restraints were procompetitive below in Part VI.

241. Apple’s experts likewise acknowledge that Apple extends this exclusivity restraint to in-app purchases of digital products after the initial distribution because Apple’s app review guidelines require apps distributed through

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download a native app onto your iPhone other than the App Store.”); Deposition of Trystan Kosmynka (Apple’s Senior Director of app review) at 140 (“A: On iOS specifically, native apps are delivered through the iOS App Store.”).

<sup>330</sup> APL-APPSTORE\_00006690 (transcript of Apple’s iPhone Software Roadmap in 2008, in which Apple announced the App Store) (Steve Jobs said: “the App Store is going to be the exclusive way to distribute iPhone applications”); APL-APPSTORE\_00006495 (slideshow for Apple’s iPhone Software Roadmap in 2008, in which Apple announced the App Store) at APL-APPSTORE\_00006690 (slide with a picture of the App Store icon and the word “Exclusive way to distribute iPhone applications”).

<sup>331</sup> Rubinfeld 2021-03-15 report in Epic v. Apple ¶112 (“suppose that Apple were no longer able to enforce its policies that all native iOS apps written using Apple-licensed software and tools be available only through the App Store.”); Schmalensee 2021-02-16 report in Epic v. Apple ¶41 (“One of the initial design features of iOS was that it did not—and still does not—enable sideloading of third party apps.”); *id.* n. 113 (“Sideloading refers to the download and installation of a third-party app not through a designated app store.”).

<sup>332</sup> Rubinfeld 2021-03-15 report in Epic v. Apple ¶12 (“Apple’s app-review policies are further necessary to prevent reputational damages to the iOS platform because customers that are harmed will not reliably discern that it was a malicious app picked up on a rogue app store, rather than instead some central feature of iOS, that was to blame”); *id.* ¶112 (“suppose that Apple were no longer able to enforce its policies that all native iOS apps written using Apple-licensed software and tools be available only through the App Store. In this but-for world, there would be an incentive for a rogue developer to create and distribute outside of the App Store an alternative app store that exercised little or no oversight, permitting the distribution and installation of apps that are buggy, are insecure, install malware, harvest users’ private data, cause excessive battery drain, and/or are bandwidth hogs, or any combination of these.”).

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Apple’s iOS app stores to use Apple’s IAP mechanisms for digital IAPs.<sup>333</sup> And Apple’s experts also acknowledge that Apple enforces the requirement that apps distributed by Apple’s iOS app stores use Apple’s IAP mechanism by including “anti-steering” rules in its review guidelines that prohibit developers from directing consumers to alternative ways they could purchase in-app products.<sup>334</sup> Instead of disputing these restraints, Apple’s experts argue that they are efficient.<sup>335</sup>

***B. All Methods of Distributing Native Apps on iOS Devices Are Foreclosed By Apple’s Exclusivity Restraints***

242. The App Store is by far the most important way that developers can distribute native iOS apps, accounting for █████ of revenue from the sales of native iOS apps or sales of digital products made within native iOS apps.<sup>336</sup> The only other distribution methods that Apple allows for native iOS app sales are Apple’s Business Manager and Apple’s School Manager, which are Apple app stores for use by businesses and schools that also charge the standard Apple commission, and thus they do not permit app sales via rival distributors. There are alternative methods that Apple allows only for the non-sale installation of iOS apps for more limited purposes, such as testing and development, namely TestFlight, Ad Hoc distribution, Enterprise Distribution, and Free Xcode provisioning. Thus, all of these alternative methods are foreclosed because none of them would allow app sales via rival distributors. A final alternative is that users could jailbreak their iOS devices, but

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<sup>333</sup> Schmalensee 2021-03-15 report in Epic v. Apple ¶233 (“developers have a contractual obligation to pay a commission to Apple for in-app purchases.”); Schmalensee 2021-03-15 report in Epic v. Apple ¶234 (“Professor Evans’ suggested allegedly less restrictive alternative business model is for the App Store to drop the requirement that developers use IAP for in-app purchases of digital content.”); Schmalensee 2021-03-15 report in Epic v. Apple ¶237 (“If one more developers were to replace IAP with a third-party payment processor, Apple would no longer automatically receive the commission payments to which it is contractually entitled”).

<sup>334</sup> Schmalensee 2021-03-15 report in Epic v. Apple ¶288 (“the App Store’s anti-circumvention rules, which require that developers use IAP to process payments for digital in-app content, have the same economic function as the anti-steering rules at issue in the Amex case. As discussed above in Section III.B, both serve to prevent free-riding”).

<sup>335</sup> Schmalensee 2021-03-15 report in Epic v. Apple ¶227 (“The fact that most online stores require use of their own payment solutions shows that this requirement has nothing to do with market power, but rather with the simple fact that it allows for an efficient and seamless way for platforms to collect commissions.”); *id.* ¶237 (“IAP is not just a payment processor. Importantly, it serves to collect Apple’s commission on paid apps and in-app payments in an efficient fashion”); *id.* ¶302 (“one core function of IAP is to efficiently collect Apple’s App Store commissions.”); *id.* ¶288 (the App Store’s “anti-circumvention rules” “serve to prevent free-riding.”).

<sup>336</sup> “ELOC805 pct of revenue during class period from educ or bus programs.csv”.



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Apple makes jailbreaking technically difficult, and distributing iOS devices on an unauthorized app store on a jailbroken device requires not only violating users’ license agreements with Apple, but also violating developers’ Xcode agreements with Apple. Thus, Apple clearly restrains using unauthorized app stores on jailbroken iOS devices as a method for iOS app sales via rival distributors. Accordingly, Apple’s restraints foreclose 100% of the iOS app distribution market, even though (as discussed below) firms violating some of those restraints have been able to engage in some minor distribution of iOS apps. Such mildly imperfect enforcement of these restraints does not, for reasons detailed below, alter the fact that none of these alternative methods for installing native iOS apps is an effective method for avoiding Apple’s exclusivity restraints and none of them constrain Apple’s ability to charge supracompetitive commissions for native iOS app distribution.

243. Even if one disputed my conclusion about the existence and scope of Apple’s exclusivity restraints, those conclusions are all common to the class. None of those conclusions vary between class members, and none of the evidence I rely upon to reach these conclusions is specific to any individual class member.

*1. Distributing Via the App Store*

244. To distribute an app through the App Store, a developer must first join the Apple Developer Program, which costs \$99/year and requires the developer to sign Apple’s “Developer Program License Agreement” (“DPLA”).<sup>337</sup>

245. Section 7 of Apple’s DPLA provides an exhaustive list of the ways developers are allowed to distribute native iOS apps under the DPLA:

“7. Distribution of Applications and Libraries.

Applications:

Applications developed under this Agreement for iOS ... may be distributed in four ways:

- (1) through the App Store, if selected by Apple,
- (2) through the Custom App Distribution, if selected by Apple;

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<sup>337</sup> Apple Developer Program, How the Program Works (available at <https://developer.apple.com/programs/how-it-works/>) (“If you’re ready to ... distribute your apps on the App Store, enroll in the Apple Developer Program. The cost is 99 USD per membership year.”).

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(3) through Ad Hoc distribution in accordance with Section 7.3, and  
 (4) for beta testing through TestFlight in accordance with Section 7.4.”<sup>338</sup>

246. None of the three non-App-Store distribution methods allowed by this provision (Custom App Distribution, Ad Hoc Distribution, and TestFlight) permit developers to sell native iOS apps or digital products within those apps through rival distributors without paying Apple’s standard App Store commission. Section 2 below explains that “Custom App Distribution” occurs through Apple’s Business Manager or Apple School Manager, for which Apple charges its standard App Store commissions. Sections 3.a-b below explain that other sections of the DPLA prohibit developers from using either Ad Hoc distribution or TestFlight to sell apps or digital products within apps.

247. Thus, Apple’s DPLA is an exclusive dealing agreement because it requires developers to sell native iOS apps and/or make sales of digital products within native iOS apps exclusively through Apple.

248. Before distributing an app on the App Store, Apple will “review” the app to ensure that it satisfies the App Stores “app review guidelines.”<sup>339</sup> Apple’s “review guidelines” include the requirement that sales of digital products made within apps distributed through the App Store use Apple’s IAP mechanism (so that Apple can collect its commission).<sup>340</sup> Through this restraint, Apple extends its

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<sup>338</sup> In contrast, the same section explicitly does *not* restrain the set of ways in which macOS apps can be distributed. Apple DPLA §7 (“**Applications for macOS** may be submitted to Apple for selection and distribution on the App Store, or **may be separately distributed.**”) (emphasis added).

<sup>339</sup> Apple, *App Review* (available at <https://developer.apple.com/app-store/review/>) (“We review all apps and app updates submitted to the App Store in an effort to determine whether they are reliable, perform as expected, respect user privacy, and are free of objectionable content.”); Apple, *App Store Review Guidelines* (available at <https://developer.apple.com/app-store/review/guidelines/>).

<sup>340</sup> Apple, *App Store Review Guidelines* (available at <https://developer.apple.com/app-store/review/guidelines/>) § 3.1.1 (“If you want to unlock features or functionality within your app, (by way of example: subscriptions, in-game currencies, game levels, access to premium content, or unlocking a full version), you must use in-app purchase. Apps may not use their own mechanisms to unlock content or functionality, such as license keys, augmented reality markers, QR codes, etc. Apps and their metadata may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than in-app purchase.”).

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exclusivity restraint on the initial distribution of native iOS apps to also give it exclusivity over any IAP mechanisms used within iOS apps that Apple distributes.

249. Further, the App Store’s review guidelines include “anti-steering” clauses that prohibit developers from including any “buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than [Apple’s] in-app purchase.”<sup>341</sup> These anti-steering provisions prohibit developers from trying to shift their customers’ purchases of digital products from within the iOS app (where they must use Apple’s IAP mechanism and pay Apple’s commission) to alternative methods that do not require the use of Apple’s IAP mechanism, such as the developers’ own websites. These anti-steering provisions thus effectively reinforce Apple’s requirement that apps distributed through the App Store must use Apple’s IAP mechanism for in-app purchases of digital products.

250. If an app passes Apple’s app review, then Apple will publish it on the App Store. Consumers can then open the pre-installed App Store app on their iOS devices and search for the app they wish to obtain.<sup>342</sup> If the app has a positive (non-zero) price, the app’s page on the App Store will include a button that displays the price; otherwise, that button will simply say “GET.”<sup>343</sup> If the app has a positive price, then the consumer’s press of the button will cause Apple’s servers to initiate a transaction that transfers money from the consumer’s account to Apple’s, and records the transaction in Apple’s database so that it can later pay the developer the “royalty” they are owed. Apple then creates an encrypted copy of the app that only that consumer’s device can install and transfers that copy to the consumer.<sup>344</sup> The

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<sup>341</sup> App Store Review Guidelines §3.1.1 (“Apps and their metadata may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than in-app purchase.”); *id.* §3.1.3 (“Apps ... cannot, either within the app or through communications sent to points of contact obtained from account registration within the app (like email or text), encourage users to use a purchasing method other than in-app purchase.”); Schmalensee 2021-03-15 report in *Epic v. Apple* ¶288 (“the App Store’s anti-circumvention rules, which require that developers use IAP to process payments for digital in-app content, have the same economic function as the anti-steering rules at issue in the Amex case. As discussed above in Section III.B, both serve to prevent free-riding”).

<sup>342</sup> Apple, *Download apps and games on your iPhone or iPad* (available at <https://support.apple.com/en-us/HT204266>) (“How to get apps. 1. On your iPhone, iPad, or iPod touch, open the App Store App. 2. Browse or search for the app that you want to download. . . . 3. Tap or click the price or Get Button.”).

<sup>343</sup> *Id.*

<sup>344</sup> Rubin 2021-03-15 report in *Epic v. Apple* ¶150 (“When a user downloads an application from the App Store, this application is encrypted and signed by Apple. To protect the Application

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consumer’s device will then decrypt the file, install the app, and display the app’s icon on the user’s device.

251. If an app includes in-app purchases, it is the developer’s responsibility to design and program the interface in the app that describes to users what they can purchase and how much it will cost.<sup>345</sup> The developer must also incorporate Apple’s IAP API into their programming code appropriately, so that the app requests that Apple initiate an IAP transaction when the user selects a digital good to purchase. When the user clicks on a button in the app to purchase a digital in-app product, Apple’s IAP interface will temporarily overlay the app and ask the consumer to confirm the purchase.<sup>346</sup> If the consumer confirms the purchase, then Apple’s servers initiate a transaction that transfers money from the consumer to Apple and records the transaction in Apple’s database so that Apple can later pay the developer the royalty it is owed.<sup>347</sup> Apple’s IAP interface will then disappear and Apple’s IAP API will report back to the app that the IAP transaction has succeeded. It is the developer’s responsibility to program the app so that it correctly unlocks the content that the user purchased when Apple’s IAP API reports that the transaction was successful.<sup>348</sup>

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even more, Apple injects a 4196-byte-long header into the executable file within the application. The header is encrypted with the public key associated with the Apple account of the user. When the application is installed, the iOS device will decrypt the header with the private key of the user, which will succeed if the application was downloaded from the App Store with matching user credentials. This technique prevents users from installing the application on a device with a different Apple account associated.”).

<sup>345</sup> Apple provides “Human Interface Guidelines” that provide developers with advice about how to design their apps’ interfaces to display possible in-app purchases. Apple, *Human Interface Guidelines: In-App Purchase* (available at <https://developer.apple.com/design/human-interface-guidelines/in-app-purchase/overview/introduction/>).

<sup>346</sup> Apple Developer Documentation, *StoreKit > In-App Purchase* (available at [https://developer.apple.com/documentation/storekit/in-app\\_purchase](https://developer.apple.com/documentation/storekit/in-app_purchase)) (“The StoreKit framework connects to the App Store on your app’s behalf to prompt for and securely process payments. The framework then notifies your app, which delivers the purchased products.”).

<sup>347</sup> *Id.*

<sup>348</sup> Apple Developer Documentation, *StoreKit > In-App Purchase > Offering, Completing and Restoring In-App Purchases* (available at [https://developer.apple.com/documentation/storekit/in-app\\_purchase/offering\\_completing\\_and\\_restoring\\_in-app\\_purchases](https://developer.apple.com/documentation/storekit/in-app_purchase/offering_completing_and_restoring_in-app_purchases)) (“Apps must deliver the content or unlock the purchased functionality after receiving a transaction whose state ... indicate[s] that the App Store has received a payment for a product from the user.”).



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*2. Distribution Via Apple’s Customized App Stores for Businesses and Schools*

252. Apple also allows the sale of iOS apps via Apple’s Business Manager and Apple’s School Manager, which are specialized Apple app stores that businesses or schools can use only for distribution to their own employees or students. Because these permitted methods are also Apple app stores that charge the same commissions as for distribution via the App Store, they do not allow iOS app sales via rival distributors or provide any way to constrain Apple’s high commissions for iOS app sales.

a. Apple Business Manager

253. Apple Business Manager is a web-based portal that helps businesses provide Apple devices (such as iPhones and iPads) and apps to their employees.<sup>349</sup> Every app that is published on the App Store is “automatically available for volume purchase for the same price in Apple Business Manager and Apple School Manager, which is where businesses and education institutions download apps for volume distribution.”<sup>350</sup> Developers can also make “custom apps” that are available only to certain businesses on Apple Business Manager, which can make sense if the apps are useful only for employees of certain businesses, rather than the general public.<sup>351</sup>

254. For example, suppose a business wants its 50 customer service employees to use iPads with PDF-editing software installed so that they can help customers fill out and digitally sign consent forms. The business could then use Apple Business Manager to purchase 50 iPads and 50 licenses for PDF-editing software (such as GoodReader<sup>352</sup>). The business could then use the Apple Business Manager to enroll the 50 iPads it purchased in “Mobile Device Management,”

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<sup>349</sup> Apple, *Apple Business Manager, About* (available at <https://www.apple.com/business/it/>).

<sup>350</sup> Apple, *Distributing Apps on Apple Business Manager and Apple School Manager* (available at <https://developer.apple.com/support/volume-purchase-and-custom-apps/>) (“All apps on the App Store are automatically available for volume purchase for the same price in Apple Business Manager and Apple School Manager, which is where businesses and education institutions download apps for volume distribution. Alternatively, you can offer your apps to educational institutions for a reduced price or identify specific organization you’d like to let download your app.”).

<sup>351</sup> Apple, *Custom apps*. (available at <https://developer.apple.com/custom-apps/>).

<sup>352</sup> App Store, *GoodReader PDF Editor & Viewer* (<https://apps.apple.com/us/app/goodreader-pdf-editor-viewer/id777310222>).

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(“MDM”) which essentially gives the business “remote control” over the devices.<sup>353</sup> The business can then remotely install the PDF editing app it purchased on all 50 of the iPads, without using the App Store.<sup>354</sup>

255. Apple’s standard 30% commission applies to transactions made through the Apple Business Manager portal,<sup>355</sup> so developers cannot use Apple Business Manager to evade Apple’s high commission rate. Further, all apps distributed through Apple Business Manager must pass Apple’s app review,<sup>356</sup> so developers could not use Apple Business Manager to circumvent Apple’s requirement that distributed apps must also use Apple for digital IAP transactions. The “Apple Business Manager Agreement” that businesses must sign to enroll in the Apple Business Manager program also explicitly prohibits businesses from distributing apps to “third parties” outside of the business.<sup>357</sup>

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<sup>353</sup> Federighi Dep. 243 (“A: ... once the device is managed, you can think of it is a form of almost remote control for administration by the company.”); Apple, Intro to device management in Apple Business Manager (available at <https://support.apple.com/guide/apple-business-manager/intro-to-device-management-asm6a88f692e/1/web/1>).

<sup>354</sup> Apple Business Manager, Getting Started Guide (available at [https://www.apple.com/business/docs/site/Apple\\_Business\\_Manager\\_Getting\\_Started\\_Guide.pdf](https://www.apple.com/business/docs/site/Apple_Business_Manager_Getting_Started_Guide.pdf)) at 10 (“After an app is assigned to a device, it’s pushed to that device by MDM ... no invitation is required”).

<sup>355</sup> Apple’s transaction data shows that, for transactions under the Business programs where a positive amount was charged to the customer and the developer did not “waive” the royalty, Apple has always charged a 30% commission. “ELOC805 comm tiers for business program.csv.”

<sup>356</sup> Any “non-custom” app must be published on the App Store before it is made automatically available on Apple Business Manager, so Apple’s standard review guidelines apply to “non-custom” apps distributed through Apple Business Manager. *See supra* note 350. The same app review guidelines for App Store apps also apply to custom apps. *See* Apple Business Manager, Getting Started Guide (available at [https://www.apple.com/business/docs/site/Apple\\_Business\\_Manager\\_Getting\\_Started\\_Guide.pdf](https://www.apple.com/business/docs/site/Apple_Business_Manager_Getting_Started_Guide.pdf)) (“Each app, as well as each version (update) of the app, submitted for custom app distribution goes through an app review process with Apple. The same app review guidelines for App Store apps apply to custom apps.”); APL-APPSTORE\_05303798 (June 2019 internal Apple email stating “We do not have a 3.1.1 [IAP requirement] exception for custom apps, and we do review them against the guidelines, with a few limited guideline exceptions: 2.5.4 Background Services... 3.2.2 Apps that Arbitrarily Restrict Access; 4.0 Poor UI, 4.2 Limited Features or Functionality, 4.3 Spam or duplicate.”).

<sup>357</sup> APL-EG\_09686433 (example Apple Business Manager agreement) §2.1 (“Institution is permitted to use the Service [Apple Business Manager] to manage Authorized Devices for use only by Authorized Users and not for general deployment to third parties”); *id.* §1 (“Authorized users means employees and contractors (or Service Providers) of Your company or organization, employees and contractors of your Permitted Entity, or other end users who are affiliated with

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b. Apple School Manager

256. Apple School Manager<sup>358</sup> is essentially identical to Apple Business Manager, with two exceptions: (1) it is only available to educational institutions; and (2) developers can choose to provide their apps for “50% of its listed price for educational institutions purchasing quantities of 20 or more.”<sup>359</sup> If developers do not choose to provide an educational volume discount, then the app’s price in Apple School Manager is the same as its price in the App Store.<sup>360</sup>

257. Apple School Manager charges the standard App Store commissions, just like Apple Business Manager.<sup>361</sup> All apps distributed through Apple School Manager must pass Apple’s standard app review, and thus they must also use Apple for digital IAP transactions.<sup>362</sup> The Apple School Manager agreement explicitly limits the distribution of apps under Apple School Manager to employees, contractors, administrators, and students.<sup>363</sup>

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Your institution (e.g., If you are an educational institution, the term “Authorized Users” also includes faculty, staff, and students of your Institution, and if You are a hospital, the term “Authorized Users” also includes credentialed physicians, referring physicians, and clinicians”); *id.* (“Permitted Entity(ies) means (a) if you are a vehicle manufacturer, Your authorized Vehicle dealerships and certified service partners; (b) if You are a hotel company, hotel properties operating under Your name, trademark, or brand... or (c) other similar entities that Apple may approve in writing at its sole discretion.”).

<sup>358</sup> Apple, Apple School Manager (available at <https://www.apple.com/education/k12/it/>).

<sup>359</sup> Apple, *Distributing Apps on Apple Business Manager and Apple School Manager* (available at <https://developer.apple.com/support/volume-purchase-and-custom-apps/>).

<sup>360</sup> *Id.*

<sup>361</sup> See “ELOC805 comm tiers for education program.csv”.

<sup>362</sup> Any “non-custom” app must be published on the App Store before it is made automatically available on Apple School Manager, so Apple’s standard review guidelines apply to “non-custom” apps distributed through Apple School Manager. See *supra* note 350. “Custom” apps also require app review. See Apple, Learn about custom apps in Apple School Manager (available at <https://support.apple.com/guide/apple-school-manager/learn-about-custom-apps-apd58ba3112a/web>) (“App review. Each custom app, as well as each updated version submitted for custom distribution, goes through the app review process with Apple. The same app review guidelines for App Store apps apply to custom apps”).

<sup>363</sup> Apple School Manager agreement (available at <https://www.apple.com/legal/education/apple-school-manager/ASM-US-EN.pdf>) §1.B (“You may use the device enrollment features of the Service to enroll only Authorized Devices in the Service”); *id.* §N (“Authorized Devices” means Apple-branded hardware that are owned or controlled by You (or which Your End Users personally own (e.g. “BYOD devices)), that have been designated for use only by End Users”); *id.* § N (“End User(s)” means those Institution employees, contractors (or Third Party Service Providers), Administrators, and/or students, as

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*3. Apple’s Exclusivity Restraints Foreclose Rival iOS App Distribution on All Alternative Methods Allowed for Installing Native Apps on iOS Devices*

258. This section discusses four alternative methods that Apple has created that technologically allow developers to install native iOS apps without using an Apple app store, but which Apple has contractually and technically restrained to prevent the sale of native iOS apps or digital IAPs through rival distributors: (a) TestFlight, (b) “Ad hoc” distribution with an Apple Developer Program membership; (c) “Enterprise” distribution; and (d) free Xcode provisioning. All four methods are also limited in ways that would not allow, even for free, any widespread distribution to retail users.

a. TestFlight

259. Apple’s “TestFlight” program allows developers to invite up to 10,000 iOS device users to test apps that are still in development.<sup>364</sup> To use TestFlight, a developer must enroll in the Apple Developer Program, which costs \$99 per year and requires the developer to sign the DPLA agreement that includes the exclusive dealing terms noted above.<sup>365</sup>

260. To test an app through TestFlight, the developer must first submit the version of the app they would like to test to Apple for app review.<sup>366</sup> If it passes app review, Apple provides the developer with a link that it can share with testers to gain

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applicable, authorized by or on behalf of Institution to use the Service in accordance with this Agreement.”).

<sup>364</sup> Apple, Beta Testing Made Simple with TestFlight (available at <https://developer.apple.com/testflight/>).

<sup>365</sup> Apple, *Membership Details* (available at <https://developer.apple.com/programs/whats-included/>) (listing TestFlight as one of the benefits of joining the Apple Developer Program); Apple DPLA §7.4.B (“You may also use TestFlight for external distribution of pre-release versions of Your Applications to a limited number of Beta Testers ... but solely for their testing and evaluation of such pre-release versions. . . . You may not charge Your Beta Tests fees of any kind to participate in Apple’s TestFlight. ... You may not use TestFlight for purposes that are not related to improving the quality, performance, or usability of pre-release versions of Your Application (e.g., continuous distribution of demo versions of Your Applications in an attempt to circumvent the App Store .... [is a] prohibited use[.]”).

<sup>366</sup> Apple, Beta Testing Made Simple with TestFlight (available at <https://developer.apple.com/testflight/>) (“When you add the first build of your app to a group, the build gets sent to beta app review to make sure it follow the App Store Review Guidelines. Testing can begin once your build is approved”).



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access to the current version of the app (developers typically share the link with testers by directly emailing them or posting the link publicly).<sup>367</sup>

261. To install an app on TestFlight, an iOS device user must first install the “TestFlight” app from the App Store.<sup>368</sup> A iOS device user will not see any apps that they can test on TestFlight unless they have clicked on an invitation link sent by a developer to test a specific app.<sup>369</sup> Versions of apps on TestFlight are valid for only 90 days after the developer uploads them.<sup>370</sup> After the 90 days elapse, the app will no longer work on the user’s device.

262. TestFlight has been run by Apple during the entire class period.<sup>371</sup> Accordingly, allowing limited installation through TestFlight does not permit any *rival* distribution of native iOS apps. Further, Apple prohibits paid transactions

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<sup>367</sup> Apple, Beta Testing Made Simple with TestFlight (available at <https://developer.apple.com/testflight/>) (“If you know a tester’s email address, you can email an invitation with a link to install your app and start testing. ... Public links let you share your app with people outside your development team without email or other contract information. You can share your public link on social media, messaging platforms, email campaigns, and more to expand the visibility of your beta test.”).

<sup>368</sup> Federighi Dep. 263-264 (Federighi Dep. 263-264 (“A: ... TestFlight is sort of a beta side of the app store, if you will. ... the app has been submitted to the app store for preliminary review. It’s been signed by Apple for TestFlight. So it’s much like app store, it’s been signed by Apple but with a ... TestFlight certificate instead of the general app store certificate. The user can then enroll in the TestFlight program, at which point they download a TestFlight app that they use both to initiate download and also to maybe communicate feedback and bugs to the developer because they’re – they’re testing the app. ... The download of that TestFlight app and the enrollment in that program essentially ... tells that device that it ... can trust software from the TestFlight program.”)).

<sup>369</sup> <https://testflight.apple.com/> (“To test beta versions of apps ... using TestFlight, you’ll need to accept an email or public link invitation from the developer to have a device that you can use to test.”).

<sup>370</sup> <https://testflight.apple.com/> (“Each build is available for up to 90 days, starting from the day the developer uploads their build. You can see how many days you have left for testing under the app name in TestFlight. ... When the testing period is over, you’ll no longer be able to open the beta build.”).

<sup>371</sup> TestFlight was a separate company that helped mobile app developers efficiently test their apps until Apple acquired it in 2014. See Casey Newton, *Apple buys marketer of the iOS testing platform TestFlight* (published February 21, 2014, available at <https://www.theverge.com/apps/2014/2/21/5434060/apple-buys-maker-of-the-ios-testing-platform-testflight>).

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between consumers and developers in apps installed via TestFlight.<sup>372</sup> Thus, developers cannot use TestFlight to evade the App Store’s commission on sales of apps or sales of digital products made within apps. Because TestFlight apps expire after 90 days, TestFlight also cannot provide a method to distribute, even for free, any permanent app. And because TestFlight apps can only be tested by up to 10,000 users while in development, TestFlight could not provide any method for widespread distribution to users even in a free and time-limited way.

b. Ad Hoc Distribution

263. “Ad hoc” distribution is an alternative way developers can test native iOS apps that are still in development.<sup>373</sup> To use ad hoc distribution, a developer must enroll in the Apple Developer Program, which costs \$99 per year and requires the developer to sign the DPLA agreement that includes the exclusive dealing terms noted above.<sup>374</sup>

264. To install an iOS app via “ad hoc” distribution on an iOS device, a user must give the developer of the app their device’s unique identifier number. The developer must then register that device’s unique identifier with Apple, and use Apple’s Xcode software on a macOS device to create a version of the app that the user can install on their device.<sup>375</sup> Each developer account can use ad hoc

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<sup>372</sup> It is always free to download an app on TestFlight, and all in-app purchases in TestFlight apps must be free. See Apple, *Testing Apps with TestFlight* (available at <https://testflight.apple.com/>) (“In-app purchases [in TestFlight] are free only during beta testing, and any in-app purchases made during testing will not carry over to App Store versions.”).

<sup>373</sup> <https://help.apple.com/xcode/mac/current/#/dev7ccaf4d3c> (“Before uploading your app to App Store connect, optionally distribute it for testing on registered devices using an ad hoc provisioning profile”).

<sup>374</sup> Apple, Membership Details (available at <https://developer.apple.com/programs/whats-included/>); Microsoft, *Free provisioning for Xamarin.iOS apps* (published 7/16/2018, available at <https://docs.microsoft.com/en-us/xamarin/ios/get-started/installation/device-provisioning/free-provisioning?tabs=windows>) (“An Apple Developer Account (Enterprise or Personal) is required to distribute via Ad Hoc...”).

<sup>375</sup> Rubin 2021-02-16 report in *Epic v. Apple* ¶102 (“Ad hoc distribution allowed limited distribution of an app outside of the App Store on up to 100 devices for testing purposes only. To do so, the developer must select a valid provisioning profile and archive the app through Xcode. The provisioning profile includes a development certificate used to sign the app. This creates a custom .ipa file that can be installed on target devices using iTunes.”) (citing <https://help.apple.com/xcode/mac/current/#/dev7ccaf4d3c>; <https://help.apple.com/xcode/mac/current/#/devcac6ab5b3>); Apple, Test a beta version, <https://help.apple.com/xcode/mac/current/#/dev7ccaf4d3c> (“Before uploading your app to App

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distribution for at most 100 devices at a time.<sup>376</sup> Further, the signatures/certificates on apps installed via ad hoc distribution expire after one year, after which iOS will refuse to run the app.<sup>377</sup> Importantly, apps distributed via ad hoc distribution will work only on the specific devices that the developer has registered with Apple; other devices will refuse to install the app.<sup>378</sup>

265. Developers can distribute apps using ad hoc distribution without going through Apple’s App Review, but the DPLA prohibits developers from using ad hoc distribution to distribute apps to third parties who are not affiliated with the developer.<sup>379</sup> Further, DPLA §3.3.3 prohibits developers from using ad hoc distribution to sell in-app digital products to users.<sup>380</sup>

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Store connect, optionally distribute it for testing on registered devices using an ad hoc provisioning profile or development provisioning profile. . . [Users’] devices need to be registered in your developer account. . . . Give the exported iOS App (IPA) file to users along with instructions on how to install the app. They can install on app on a device using Xcode or install an app on a device using Apple Configurator 2 [both of which are macOS applications]).

<sup>376</sup>

See

<https://developer.apple.com/library/archive/documentation/ToolsLanguages/Conceptual/DevPortalsGuide/DistributinganApp/DistributinganApp.html> (“iOS developers enrolled in the Standard Program can also distribute an app outside of the App Store on up to 100 difference devices for testing purposes only. To use ad hoc distribution...”).

<sup>377</sup> Jesal Gadhia, How to renew expired Certificate & Provisioning Profile for Ad Hoc Distribution (published August 19, 2013, available at <https://jes.al/2013/08/how-to-renew-expired-certificate-provisioning-profile-for-ad-hoc-distribution/>) (“Apple requires it’s developers to rebuild and redeploy their apps with a new Provisioning Profile each year. Here are the steps that you would need to follow when your profile is close to its expiration date so you keep your app running without interruptions...”).

<sup>378</sup> Peitro Rea & Keegan Rush, *Internal Distribution* (available at <https://www.raywenderlich.com/books/ios-app-distribution-best-practices/v1.0/chapters/5-internal-distribution>) (“Regardless of how you choose to share the IPA, it’s worth re-emphasizing that only registered devices, can install ad hoc IPAs. A common source of frustration is sharing an ad hoc build to someone who doesn’t show up in the list of registered UDIDs, so make sure you’re clear on who’s in and who’s out.”).

<sup>379</sup> Apple DPLA §7.3 (“Distribution on Registered Devices (Ad hoc distribution)... You may also distribute Your Applications for iOS ... to individuals within Your company, organization, educational institution, group, or who are otherwise affiliated with You for use on a limited number of Registered Devices ... if Your Application has been digitally signed using Your Apple Certificate.”).

<sup>380</sup> Apple DPLA §3.3.3 (“Without Apple’s prior written approval or as permitted under Section 3.3.25 (In-App Purchase API), an Application may not provide, unlock, or enable features or functionality through distribution mechanisms other than the App Store, Custom App Distribution, or TestFlight.”); *id.* §3.3 (“Any Application that will be submitted to the App Store,

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266. In sum, both contractual and technological restraints prevent developers from using ad hoc distribution to sell apps or in-app products to third parties:

- The DPLA that a developer must sign to use ad hoc distribution prohibits the developer from using ad hoc distribution to distribute apps to users outside the developer’s organization.
- The DPLA also prohibits developers from making transactions with customers within apps distributed via ad hoc distribution.
- Even if the developer were willing to violate the DPLA terms, ad-hoc distribution would not allow the widespread distribution of permanent apps because of the 100-device limit and the fact that apps installed via ad hoc distribution expire after one year.

c. Enterprise Distribution

267. “The Apple Developer Enterprise Program allows large organizations to develop and deploy proprietary, internal-use apps to their employees. This program is for specific use cases that require private distribution directly to employees.”<sup>381</sup> To join the Apple Developer Enterprise Program, the developer must be a business with at least 100 employees, must sign the Apple Enterprise Program License Agreement, and must pay \$299 per year.<sup>382</sup>

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Custom App Distribution, or TestFlight, or that will be distributed through Ad Hoc distribution, must be developed in compliance with Documentation and Program requirements, the current set of which is set forth below in Section 3.3). DPLA § 3.3.25 states that “All use of the In-App Purchase API and related services must be in accordance with the terms of this Agreement.”

<sup>381</sup> Apple, *Apple Developer Enterprise Program* (available at <https://developer.apple.com/programs/enterprise/>).

<sup>382</sup> *Id.* (In addition, the following eligibility requirements apply. Your organization must: Have 100 or more employees. Be a legal entity. We do not accept DBAs, fictitious businesses, trade names, or branches. Use the program only to create proprietary, in-house apps for internal use, and to distribute these apps privately and securely to employees within the organization. Have systems in place to ensure only employees can download your internal-use apps, and to protect membership credentials and assets. ... If your organization is approved for membership in the Apple Developer Enterprise Program, you will receive the enterprise program license agreement for review and acceptance.”).



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268. The Apple Enterprise Program License Agreement explicitly prohibits developers from using Enterprise Distribution to distribute apps to third parties.<sup>383</sup> This agreement also explicitly prohibits Enterprise developers from charging users for Enterprise apps or in-app products.<sup>384</sup>

269. Once a developer is approved for the Enterprise Developer program, it can request Enterprise “provisioning profiles” from Apple. An Enterprise provisioning profile is a file that can be installed on iOS devices that tells the iOS device to “trust” any app signed by that particular Enterprise Developer.<sup>385</sup> The Enterprise Developer therefore distributes their apps internally to their employees’ devices by transferring both: (1) the enterprise app signed by the Enterprise Developer; and (2) the Enterprise Developer’s provisioning profile.<sup>386</sup> Each device needs to install the Enterprise provisioning profile before it can install any apps signed by the Enterprise Developer; otherwise the device will not “trust” apps signed by the Enterprise developer.<sup>387</sup> Because Enterprise developers distribute the apps

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<sup>383</sup> APL-APPSTORE\_06277813 (“This Program is for internal use, custom applications that are developed by You for Your specific business purposes and only for use by Your employees and, in limited cases, by certain other parties as set forth herein. If You want to distribute applications for iOS, watchOS, or tvOS to third parties or obtain an application from a third party, then You must use the App Store or B2B Program [precursor to Apple Business Manager] for distribution.”).

<sup>384</sup> APL-APPSTORE\_06277813 §3.3.3 (“An Internal Use Application that will be used by Customers may not permit commerce, credits or purchases of any kind to be made through the use of such Application, without Apple’s express prior written consent. Further, You may not charge Your Permitted Entity, or any Customers, Employees, or Permitted Users, in any way for the use of such Application.”).

<sup>385</sup> Federighi Dep. 236-238 (“A: the ... enterprise creates a – it’s called a profile that they distribute to their employees. And the profile includes the information about the enterprise signing certificate that basically says, ‘Your device should trust software that is signed with the enterprise certificate.’ And the user installs that – each employee will install that on their device. They’re [asked] do you trust this source of applications. ... And if the user says yes, then subsequently, when they download an application that was signed by that enterprise profile, their device will consider that a valid, trusted source for running that app.”).

<sup>386</sup> Federighi Dep. 236-238.

<sup>387</sup> Federighi Dep. 236-238. Rubin 2021-03-15 report in Epic v. Apple ¶221 (“if a user works at a company that is a part of the Apple Developer Enterprise Program, the user can install a company-specific app that is not available on the App Store. In order to download and install the app, the user must first trust the certificate that Apple issued to the user’s company. Upon doing so, iOS will allow the company app to run on the user’s device because the user has trusted the certificate.”).

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and provisioning profiles themselves, they never need to send the apps to Apple for App Review.<sup>388</sup>

270. Apple refers to Enterprise provisioning profiles as “Universal Provisioning Profiles” because they can be installed on *any* iOS device.<sup>389</sup> Thus, the contractual prohibition on Enterprise distribution to third parties does not appear to be reinforced by any *technological* restraint on doing so. For example, if, contrary to its agreement with Apple, an Enterprise developer published a link to its Enterprise provisioning profile and its apps to a public website, anyone with an iOS device could install the Enterprise provisioning profile and the install any of the Enterprise Developer’s apps, without going through the App Store or App Review.<sup>390</sup> Indeed, the evidence shows that a small number of developers have

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<sup>388</sup> Federighi Dep. 245 (“with an enterprise-signed app, Apple does not ... ever review the app ... It doesn’t ever see the app at all.”).

<sup>389</sup>

<sup>390</sup> APL-APPSTORE 04707849

Apple Developer, *Distributing an App* (available at <https://developer.apple.com/library/archive/documentation/ToolsLanguages/Conceptual/DevPort alGuide/DistributinganApp/DistributinganApp.html>) (“iOS developers enrolled in the Enterprise Program can distribute in-house without identifying individual devices or using the App Store. To distribute your app in-house, create an archive of your app, or have a teammate send you an archived app. Distribute your internal app using your company’s authorized software distribution



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violated their agreement with Apple to use Enterprise distribution licenses to distribute apps to third-parties while avoiding Apple’s app review and commissions.<sup>391</sup> Some developers (such as TutuApp) have even violated their Apple agreements by using Enterprise distribution to create “pirate app stores,” but Apple enforces its exclusivity restraint against those unauthorized stores by invalidating their Enterprise certificates and/or terminating their Enterprise Developer accounts when they are detected.<sup>392</sup>

271. Thus, the Enterprise Distribution method shows that Apple already has the *technological infrastructure* in place that would allow users to make their iOS devices “trust” certain developers and install apps with those developers’ digital

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mechanism. Because the app file can be installed on any iOS device, make sure you protect the distribution of this file.”).

<sup>391</sup> APL-APPSTORE\_09553224 at APL-APPSTORE\_09553234 (“Problem: Fraudsters abuse Enterprise Developer profile and distribute pirate Apps outside of App Store.”); Yonni Schelmerdine, *Demystifying iOS Enterprise Certificates* (published February 25, 2015, available at <https://www.tripwire.com/state-of-security/off-topic/demystifying-ios-enterprise-certificates/>) (“Using enterprise certificates to install apps that haven’t been truly validated by Apple, or to install malicious surveillance software surreptitiously on a device isn’t a new technique. Although it does enable companies to distribute their own apps, it also opens the door to everything else.”).

<sup>392</sup> See, e.g. APL-APPSTORE\_04462647 (internal Apple email stating “I received several reports from engineers in the field about a pirate App Store they see being used on devices that are part of large-scale deployments. ... This is website in question: [www.vshare.com/cshare\\_en.html](http://www.vshare.com/cshare_en.html).”). Another employee responds “Thanks ... we have initiated the termination of their Enterprise Program membership.”); APL-APPSTORE\_09551602 [REDACTED]

[REDACTED] APL-APPSTORE\_09572616 at APL-APPSTORE\_09572638 (“Between July 2017 and June 2018” 246 developer accounts were terminated for “enterprise abuse.” And Apple identified “126 enterprise cert[ifications] in use by pirate app stores.”); APL-EG\_08958168 [REDACTED]

[REDACTED] Nick Statt, *This illicit iPhone app store has been hiding in plain sight* (published February 20, 2019, available at <https://www.theverge.com/2019/2/20/18232140/apple-tutuapp-piracy-ios-apps-developer-enterprise-program-misuse>) (“the marketplace, called TutuApp, is just one of many illicit iOS app stores that can easily be sideloaded onto your Apple Device.... Companies like TutuApp, TweakBox, and the now-defunct App Valley were distributing pirated games and ad-free copies of Spotify to people’s iPhones by abusing Apple’s enterprise certificate program.... It’s as simple to download an entire illicit app store for your iPhone as following this link... From there, you’re asked to give TutuApp permission to install an enterprise certificate. ... [An Apple spokesperson said] “Developers that abuse our enterprise certificates are in violation of the Apple Developer Enterprise Program Agreement and will have their certificate terminated”).

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signatures. Such a technological infrastructure could potentially support the efficient sale of iOS apps, either directly by developers or through a rival iOS app distributor. But Apple restrains developers from using that technological infrastructure to sell iOS apps by contractually prohibiting paid transactions for Enterprise apps or in-app products, restraining which developers can join the Enterprise Program, and by contractually banning Enterprise developers from distributing apps to third parties.

d. Free Xcode Provisioning

272. “Free Xcode provisioning” is the process of installing a native app on a non-jailbroken iOS device *without* enrolling in the Apple Developer Program (which costs \$99/year) or the Apple Enterprise Developer Program (which costs \$299/year).<sup>393</sup> As Apple acknowledges, Free Xcode provisioning is just for limited testing, not distribution.<sup>394</sup> To install an iOS app using free Xcode provisioning, a developer must first obtain a macOS device and install Xcode, which is the “integrated development environment” that Apple provides for developers to program apps for Apple operating systems (including not only iOS, but also macOS and watchOS).<sup>395</sup> To install Xcode a user must sign an agreement that: (1) prohibits using Free Xcode provisioning to distribute iOS applications; (2) allows installation only on a “limited number” of test units; (3) and permits installation “only for internal testing and development of Your Applications, or for Your own personal, non-commercial use.”<sup>396</sup> The contract thus clearly prohibits using Free Xcode provisioning as a method for selling iOS apps via rival distributors.

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<sup>393</sup> Apple, *Enrollment in Apple Developer Program* (available at <https://developer.apple.com/support/enrollment/>) (“Do I need to enroll to install apps on a device? No. You can install apps on a device for free with Xcode. You’ll only need to enroll if you’d like to distribute apps...”).

<sup>394</sup> Apple, *Choosing a Membership* (available at <https://developer.apple.com/support/compare-memberships/>) (“You can learn how to develop apps for Apple platforms for free without enrolling [in the Apple Developer Program]. With just an Apple ID, you can ... test your apps on devices [using Xcode free provisioning] ... To distribute apps, join the Apple Developer Program.”).

<sup>395</sup> Apple, Xcode (available at <https://developer.apple.com/xcode/>).

<sup>396</sup> Xcode and Apple SDKs Agreement (available at <https://www.apple.com/legal/sla/docs/xcode.pdf>) §2.2A (“Except as otherwise expressly set forth in Section 2.2B., You may not distribute any Applications developed using the Apple SDKs (excluding the macOS SDK) absent entering into a separate written agreement with Apple.”); *id.* 2.2.B (providing that the free Xcode provisioning can be used only “to install Your Applications onto a reasonable, limited number of Authorized Test Units solely for use by You and /or Your



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273. Apple has reinforced these contractual exclusivity restraints with technical restraints that make apps installed via free Xcode provisioning (1) expire after 7 days and (2) hard to install on anything other than the developer’s personal devices. To use Xcode, a developer must sign into Xcode with their personal Apple ID (i.e., the same Apple ID the developer would use to log into the App Store and purchase apps on their own device).<sup>397</sup> The developer must then create the app’s “Project” in Xcode; the “Project” contains all of the programming code and other resources (such as images and audio files) that comprise the app.<sup>398</sup> The developer must then connect their iOS device to their macOS device (typically with a USB cable), at which point Xcode will give the developer the option of installing the app to the iOS device. To use free Xcode provisioning, the developer must “sign” the app using their own personal Apple ID.<sup>399</sup> Xcode will then build an “.ipa” file that contains the information necessary to install the app and transfer it to the iOS device.<sup>400</sup> One must then go to the “Device Management” setting in the iOS device, which will state “Apps from developer [name of developer using free Xcode provisioning] are not trusted on this iPhone and will not run until the developer is

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Authorized Developers and only for internal testing and development of Your Applications, or for Your own personal, non-commercial use.”)

<sup>397</sup> Alex Muramoto, *Deploying to a Device without an Apple Developer Account* (published August 2, 2016, available at <https://ionicframework.com/blog/deploying-to-a-device-without-an-apple-developer-account/>). In contrast, a developer who is a member of the Apple Developer Program will have a “Developer ID” that is different from their personal “Apple ID”.

<sup>398</sup> <https://developer.apple.com/library/archive/featuredarticles/XcodeConcepts/Concept-Projects.html#:~:text=An%20Xcode%20project%20is%20a,specify%20how%20to%20build%20products> (“An Xcode project is a repository for all the files, resources, and information required to build one or more software products.”).

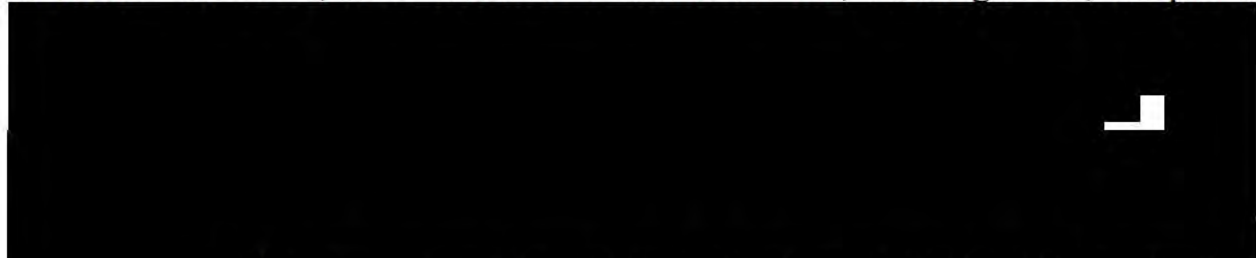
<sup>399</sup> *See* [https://developer.apple.com/library/archive/qa/qa1915/\\_index.html///apple\\_ref/doc/uid/DTS40017617](https://developer.apple.com/library/archive/qa/qa1915/_index.html///apple_ref/doc/uid/DTS40017617) (“Xcode 7 and Xcode 8 allow you to select the free personal team provided with your Apple ID for signing your app. This team allows you to build apps for your personal use on devices owned by you, but it does not allow you to code sign apps destined for the App Store or for enterprise use.”; Microsoft, *Free provisioning for Xamarin.iOS apps* (published 7/16/2018, available at <https://docs.microsoft.com/en-us/xamarin/ios/get-started/installation/device-provisioning/free-provisioning?tabs=windows>) (“Apple has imposed a number of limitations on when and how you can use free provisioning to run your application on an iOS device, ensuring that you can only deploy to your device.”).

<sup>400</sup> Alex Muramoto, *Deploying to a Device without an Apple Developer Account* (published August 2, 2016, available at <https://ionicframework.com/blog/deploying-to-a-device-without-an-apple-developer-account/>).

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trusted,” and give the user the option to “Trust” the developer.<sup>401</sup> If the iOS device user “trusts” the developer, then the app will install on the iOS device. However, the “certificate” on an app installed via free Xcode provisioning expires after 7 days, after which iOS will refuse to run the app.<sup>402</sup> None of these steps for free Xcode provisioning involve sending the app to Apple for App Review.

274. These technical restraints reinforce the contractual exclusivity restraint because 7-day apps are naturally suitable only for testing and restraining installations that are not to a developer’s own iOS device restrains the distribution or sale of apps to others. However, these technical restraints are not, standing alone, foolproof.

 <sup>404</sup> In any event, this activity is clearly prohibited by the contractual exclusivity restraints that forbid using free Xcode provisioning to distribute iOS applications and that allow installation only on a limited number of test units for testing and development or personal, non-commercial use.

275. More recently, a developer has created an alternative iOS app store, called “AltStore,” that has evaded these technical restraints by persuading users to give AltStore their actual personal Apple IDs and passwords (notwithstanding the apparent security risks), and AltStore then signs copies of the apps with the user’s personal Apple ID and password to install apps on their iOS devices using free

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<sup>401</sup> Alex Muramoto, *Deploying to a Device without an Apple Developer Account* (published August 2, 2016, available at <https://ionicframework.com/blog/deploying-to-a-device-without-an-apple-developer-account/>).

<sup>402</sup> Microsoft, Free provisioning for Xamarian.iOS apps (published 7/16/2018, available at <https://docs.microsoft.com/en-us/xamarin/ios/get-started/installation/device-provisioning/free-provisioning?tabs=windows>) (“Apple has imposed a number of limitations on when and how you can use free provisioning to run your application on an iOS device, ensuring that you can only deploy to your device. ... Provisioning profiles created with free provisioning will expire after one week”).

<sup>403</sup> APL-APPSTORE\_00240525.

<sup>404</sup> APL-APPSTORE 00240525; APL-APPSTORE 06529406 at APL-APPSTORE 06529407 

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Xcode provisioning.<sup>405</sup> To evade the 7 day expiration limit, AltStore also “refreshes” the apps every 7 days by reinstalling them with a new XCode certificate.<sup>406</sup> Such distribution via AltStore is obviously quite cumbersome in ways that limit its attraction to users. AltStore is used primarily to play Nintendo games on iOS devices,<sup>407</sup> and AltStore makes less than \$15,000 per month.<sup>408</sup> This compares to the over [REDACTED] per month that Apple makes on iOS app sales and IAPs via its app stores.<sup>409</sup> Thus, while the technical restraints are not foolproof, evasion of them have had too minimal an effect to constrain Apple’s commissions. Moreover, such technological evasion remains prohibited by the contractual exclusivity restraints that forbid using free XCode provisioning to distribute iOS applications and that allow installation only on a limited number of test units for testing and development or personal, non-commercial use.

276. In contrast, Apple does not use the same contractual exclusivity restraints to prohibit the distribution of macOS applications using free XCode provisioning macOS applications.<sup>410</sup> Nor does any other firm with popular operating

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<sup>405</sup> Killian Bell, *How to install AltStore, the App Store alternative, on iPhone and iPad* (available at <https://www.cultofmac.com/713129/how-to-install-AltStore-iphone-ipad/>); AltStore, FAQ (available at <https://altstore.io/faq/>).

<sup>406</sup> AltStore, FAQ, available at (<https://altstore.io/faq/>) (“Unfortunately, apps that have been installed using non-developer Apple IDs (in other words, Apple IDs not tied to a \$99/year Apple developer account) are only valid for 7 days, at which point they will no longer open. To compensate for this, AltStore will periodically attempt to refresh your apps in the background, and you can always manually refresh your apps from within AltStore.”)

<sup>407</sup> Riley Testut, *Introducing AltStore* (published September 25, 2019, available at [rileytestut.com/blog/2019/09/25/introducing-AltStore/](https://rileytestut.com/blog/2019/09/25/introducing-AltStore/)) (“AltStore is an alternative app store for non-jailbroken devices. Unlike other unofficial app stores today, AltStore does *not* rely on enterprise certificates, which Apple has been cracking down on more and more recently.... AltStore will initially launch with two of my own apps included: Delta, my all-in-one emulator I’ve been working on for the past 4+ years, as well as Clip, a simple clipboard manager app.”); Delta Emulator (available at <https://deltaemulator.com/>).

<sup>408</sup> Patreon, *Riley Testut* (available at <https://www.patreon.com/rileytestut>, last accessed May 15, 2021). Riley Testut is the developer of AltStore and Delta. AltStore users can pay \$3 per month to get “Beta Access” to the most recent apps on the AltStore. As of May 2021, Patreon reports that the developer of AltStore receives \$14,599 per month through Patreon.

<sup>409</sup> In September 2019 (the most recent month for which Apple has produced transaction data thus far), Apple’s total commissions from the App Store in the United States were [REDACTED]. “ELOC716 Apple iOS app distribution comms Sep 2019.txt”.

<sup>410</sup> Xcode and Apple SDKs Agreement Section 2.2 A, <https://www.apple.com/legal/sla/docs/xcode.pdf> (“You may not distribute any Applications developed using the Apple SDKs (*excluding the macOS SDK*) absent entering into a separate



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system for general purpose computing devices use technological restraints that make apps developed without a paid developer account artificially “expire” after seven days and hard to install on anything other than the developer’s personal devices. On Android, for example, developers can build an “.apk” file (the file that contains the information necessary to install an Android app) without a paid Google Play developer account (which costs \$25) and can install the “.apk” file on any Android device, so long as the user of the Android device chooses to “trust” the developer.<sup>411</sup> Unlike with iOS, the installed Android app will *not* artificially “expire” after seven days; instead, the Android app will remain on the user’s phone until they choose to uninstall it.

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written agreement with Apple.”) (emphasis added); *id.* Section 2.4 (“If You would like a third-party to use Your Application *for iOS, watchOS, iPadOS, or tvOS*, or You would like to distribute Your Application for macOS through the App Store, then You must enter into a separate written agreement with Apple (the Apple Developer Program License Agreement) and Your Application must comply with the Program Requirements and Documentation. For clarity, *macOS applications and libraries may be distributed without entering into a separate written agreement with Apple* so long as such applications and libraries comply with the terms of this Agreement.”) (emphasis added).

<sup>411</sup> Rubin (Apple computer science expert) 2021-02-16 report in *Epic v. Apple* ¶114 (“Sideloaded is an accepted part of Android architecture, and available to any user without additional tools. On Android devices, the user simply has to download an APK from the web to install an app. In contrast, Apple has not designed the iPhone to facilitate sideloading of third-party applications.”); Android Developers, *Publish your App* (available at <https://developer.android.com/studio/publish>) (“If you do not want to release your app on a marketplace like Google Play, you can make the app available for download on your own website or server, including on a private or enterprise server. To do this, you must first prepare your application for release in the normal way. Then all you need to do is host the release-ready APK file on your website and provide a download link to users.

“When users browse to the download link from their Android-powered devices, the file is downloaded and Android system automatically starts installing it on the device. However, the installation process will start automatically only if the user has configured their Settings to allow the installation of apps from unknown sources.

“Although it is relatively easy to release your application on your own website, it can be inefficient. For example, if you want to monetize your application you will have to process and track all financial transactions yourself and you will not be able to use Google Play’s In-app Billing service to sell in-app products. In addition, you will not be able to use the Licensing service to help prevent unauthorized installation and use of your application.”).



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*4. Apple Also Forecloses Rival iOS App Distribution on Jailbroken iOS Devices*

277. “Jailbreaking” an iOS device means making an “unauthorized modification” of iOS.<sup>412</sup> “Jailbreaking” has two main potential benefits to users: (1) easier installation of native iOS apps without using the App Store; and (2) adding features that were not in iOS.<sup>413</sup> Because jailbreaking circumvents the technological restraints on installing iOS apps, those rare users who “jailbreak” their iOS devices often use rival iOS app distributors who cater specifically to jailbroken iOS devices, like Cydia.<sup>414</sup>

278. However, jailbreaking is contractually restrained by Apple. Under users’ licensing agreements with Apple, jailbreaking an iOS device is prohibited and voids the device warranty.<sup>415</sup> Further, Apple imposes contractual exclusivity restraints that would prohibit developers from distributing iOS apps on a jailbroken device through an app store that Apple did not authorize. Because developers need Xcode to create native iOS apps,<sup>416</sup> they have to sign an Xcode agreement with

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<sup>412</sup> Apple, *Unauthorized modification of iOS can cause security vulnerabilities, instability, shortened battery life, and other issues* (available at <https://support.apple.com/en-gb/HT201954>) (“This article is about adverse issues experienced by customers who have made unauthorized modifications to iOS (this hacking process is often called “jailbreaking”)”).

<sup>413</sup> van der Kleut, *Is jailbreaking legal and safe?* (available at [us.norton.com/internetsecurity-mobile-is-jailbreaking-legal-and-safe.html](https://us.norton.com/internetsecurity-mobile-is-jailbreaking-legal-and-safe.html), accessed 9/22/2020) (“Jailbreaking is the process by which Apple users can remove software restrictions imposed on iOS and Apple products. Jailbreaking allows root access to iOS and lets users install applications, extensions, and other software applications that are not authorized by Apple’s App Store.”); Rubin 2021-03-15 report in *Epic v. Apple* ¶222 (“allowing unsigned apps on iOS devices is one of the primary driving forces behind jailbreaking iOS devices.”).

<sup>414</sup> Ellis Hamburger, *How to: Use Cydia’s Jailbroken iPhone Store And Get All Those Apps Apple Won’t Let You Have* (published May 2, 2011, available at <https://www.businessinsider.com/how-to-use-cydia-for-iphone-2011-5>) (“Cydia is the premier ‘app store’ for jailbreakers, enabling you to download apps, tweaks, themes, add-ons and more. ... Cydia includes many features Apple’s App Store should have, like the ability to install apps from external sources at your choosing...”).

<sup>415</sup> Apple, *Unauthorized modification of iOS can cause security vulnerabilities, instability, shortened battery life, and other issues* (available at <https://support.apple.com/en-gb/HT201954>) (“unauthorized modification of iOS is a violation of the iOS end-user software license agreement and because of this, Apple may deny service for any iPhone, iPad, or iPod touch that has installed any unauthorized software.”).

<sup>416</sup> Alex Nekrasov, *How to Write iOS Apps Without Xcode* (available at <https://betterprogramming.pub/writing-ios-apps-without-xcode-89450d0de21a>) (“Apple did everything possible to prevent developers from using other platforms [besides Xcode to develop native iOS apps]. Native iOS apps can be developed only on Mac. ... Alternative IDEs [integrated

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Apple that (1) prohibits the distribution of iOS applications without a separate agreement with Apple; (2) allows installation only on a “limited number” of test units; (3) and permits installation “only for internal testing and development of Your Applications, or for Your own personal, non-commercial use.”<sup>417</sup> Thus, distributing iOS apps on a jailbroken device through an app store that Apple did not authorize would violate the developer’s Xcode agreement with Apple.

279. Jailbreaking is also technologically restrained. Jailbreaking an iOS device is often technically difficult, and sometimes requires the use of additional devices (usually a macOS device).<sup>418</sup> Some jailbreaks stop working each time a user reboots their device, forcing the user to repeatedly jailbreak their phones each time they reboot.<sup>419</sup> Many jailbreaks also stop working when Apple updates iOS, or work for only certain specific versions of iOS.<sup>420</sup> Consequently, users often must purposefully avoid iOS updates in order to keep their iOS devices jailbroken. Jailbreaking also risks permanently breaking the device and exposes users to

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development environments] for iOS development require Xcode. You don’t need to run it, but you should have it installed.”); Amazon, *iOS Development* (available at <https://aws.amazon.com/mobile/mobile-application-development/native/ios/>) (“It is important to note that Xcode only runs on Mac OS X and [is] the only supported way to develop iOS apps.”).

<sup>417</sup> Xcode and Apple SDKs Agreement Section 2.2A <https://www.apple.com/legal/sla/docs/xcode.pdf> (“Except as otherwise expressly set forth in Section 2.2B., You may not distribute any Applications developed using the Apple SDKs (excluding the macOS SDK) absent entering into a separate written agreement with Apple.”); *id.* 2.2.B (providing that the free XCode provisioning can be used only “to install Your Applications onto a reasonable, limited number of Authorized Test Units solely for use by You and /or Your Authorized Developers and only for internal testing and development of Your Applications, or for Your own personal, non-commercial use.”)

<sup>418</sup> 9to5Mac, *Jailbreak* (available at <https://9to5mac.com/guides/jailbreak/>) (“Jailbreak tools vary from jailbreak to jailbreak. Some tools consist of tiny utilities that must be executed from a Mac or Windows machine, while other jailbreak methods can be executed right on device without needing to connect to a computer.”).

<sup>419</sup> Amboy Manalo, *Re-Enable Checkra1n Jailbreak After Restarting Your iPhone* (published November 13, 2019, available at <https://ios.gadgethacks.com/how-to/re-enable-checkra1n-jailbreak-after-restarting-your-iphone-0212516/>) (“The biggest handicap of a semi-untethered jailbreak is the need to manually kickstart it whenever your phone powers down or reboots.”).

<sup>420</sup> See e.g., Joaquim Barbosa, *Jailbreak Guide: Can I Jailbreak* (available at <https://www.idownloadblog.com/2021/02/11/jailbreak-guide-can-i-jailbreak/>) (Advising users with iOS devices using iOS versions 13.0-13.5 to “stay there. Do not update, turn off automatic updates on your device and block updates” in order to maintain the ability to jailbreak).

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additional security risks (such as viruses and malware) and other problems.<sup>421</sup> Apple’s website adds that, “Unauthorized modification of iOS can cause security vulnerabilities, instability, shortened battery life, and other issues.”<sup>422</sup>

280. As a result, although jailbreaking iOS devices was reasonably common when the iPhone first came out,<sup>423</sup> it is rare for users to jailbreak their iOS devices now.<sup>424</sup> This is in part because Apple has made jailbreaking significantly more difficult over time by altering the design of its iOS devices and the iOS operating system.<sup>425</sup> Another reason jailbreaking has become rare is that the benefits of

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<sup>421</sup> Apple, *Unauthorized modification of iOS can cause security vulnerabilities, instability, shortened battery life, and other issues* (available at <https://support.apple.com/en-gb/HT201954>) (“Jailbreaking your device eliminates security layers designed to protect your personal information and your iOS device. With this security information removed from your iOS device, hackers may steal your personal information, damages your device, attack your network, or introduce malware, spyware, or viruses. ... Services such as iCloud, iMessage, FaceTime, Apple Pay, Visual Voicemail, Weather, and Stock, have been disrupted or no longer work on the device [after it is jailbroken]. ... Some unauthorized modifications have caused damages to iOS that is not repairable. This can result in the hacked iPhone, iPad, or iPod touch becoming permanently inoperable when a future Apple-supplied iOS update is installed.”).

<sup>422</sup> *Id.*

<sup>423</sup> Reed, Albergotti, The ‘app store’ before there was an App Store wants to liberate your iPhone ... again (published December 10, 2020, available at <https://www.washingtonpost.com/technology/2020/12/10/cydia-apple-lawsuit/>) (“There were so many people using [Cydia] that [Freeman, the founder of Cydia] estimated half of early iPhone customers must have been ‘jailbreaking’ their phones to take advantage of the additional features it offered. In 2010, Freeman told the Washington Post that Cydia had 4.5 million people searching for apps every week. . . Cydia’s revenue peaked in 2011 and 2012, when it brought in about \$10 million, Freeman said. Cydia, like Apple, charged developers a commission on sales.”).

<sup>424</sup> For example, the most popular “jailbreak” app store, Cydia, ceased accepting payments in December 2018, in part because it was no longer profitable for Cydia’s developer. *See* [https://www.reddit.com/r/jailbreak/comments/a5wfg9/news\\_andrew\\_wiik\\_recommend\\_that\\_eve\\_ryone\\_removes/ebpur5a/?context=1](https://www.reddit.com/r/jailbreak/comments/a5wfg9/news_andrew_wiik_recommend_that_eve_ryone_removes/ebpur5a/?context=1) (forum post by “saurik” the username of Cydia’s developer. In the post, he states “this service [Cydia] loses me money”); 9to5Mac, *Jailbreak* (available at <https://9to5mac.com/guides/jailbreak/>) (“Cydia is by far the most popular way for jailbroken users to acquire apps and tweaks to modify their jailbroken device.”). *See also* Chris Smith, *Apple launches iOS 13.5.1 to patch rare unc0ver jailbreak* (published July 1, 2020, available <https://www.trustedreviews.com/news/apple-launches-ios-13-5-1-to-patch-rare-unc0ver-jailbreak-4035067>) (“Jailbreaks have become increasingly rare in recent years.”)

<sup>425</sup> Lily Hay Newman, *There’s a Jailbreak Out for the Current Version of iOS* (published May 23, 2020, available at <https://www.wired.com/story/apple-ios-unc0ver-jailbreak/>) (“Over the years, Apple has made it prohibitively difficult to install unapproved software on its locked-down devices. . . . The jailbreaking heyday of iOS largely wound down with the release of iOS 9 in 2015; that’s when Apple introduced a new kernel security feature called Rootless and other initiatives to

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jailbreaking have decreased over time. When the iPhone first came out, iOS was very limited and could not perform many of the functions that are now standard on (non-jailbroken) iOS devices, such as the ability to quickly pull up a “Control Center” to toggle WiFi, Bluetooth, and Do Not Disturb settings.<sup>426</sup> Jailbreaking therefore allowed users of early iOS devices to use these features while they waited for Apple to officially integrate those features into iOS. Now that Apple has integrated most of the features available in jailbreaks into iOS, users gain less by jailbreaking.<sup>427</sup> With those lower benefits, the tightened restraints have been particularly effective at deterring jailbreaking.

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safeguard iOS”); Federighi Dep. 291 (“Q: ... does Apple undertake various methods for restricting jailbreaking iOS devices? A: Yes. We do); Chris Smith, *Apple launches iOS 13.5.1 to patch rare unc0ver jailbreak* (published July 1, 2020, available <https://www.trustedreviews.com/news/apple-launches-ios-13-5-1-to-patch-rare-unc0ver-jailbreak-4035067>) (“Jailbreaks have become increasingly rare in recent years. . . . Apple has been able to safeguard against jailbreak attempts in recent years, but it was once rife among hackers who sought to undermine Apple’s efforts to wall off its iOS ecosystem”); 9to5Mac, *Jailbreak* (available at <https://9to5mac.com/guides/jailbreak/>) (“Since jailbreaking takes advantage of security vulnerabilities, Apple works hard to patch these vulnerabilities. Once a vulnerability is patched, a new version of iOS is released and the signing window for previous susceptible versions are closed, making it impossible for users to upgrade or downgrade to the vulnerable version of iOS.”).

<sup>426</sup> Amboy Manalo, 60 iOS Features Apple Stole from Jailbreakers (published November 2, 2018, available at <https://ios.gadgethacks.com/how-to/60-ios-features-apple-stole-from-jailbreakers-0188093/>) (“When iOS first came out, it was bare with very little options for customization, but resourceful developers within the underground jailbreak community found ways to improve on Apple’s software so that more technical users can do all sorts of things in iOS that Apple never even thought of.”); *id.* (“Since its introduction in iOS 7, the Control Center that we’ve all grown accustomed to can be accessed with a simple swipe up from the bottom of the screen (it’s now a swipe down from top-right if you have an iPhone with Face ID). Control Center includes some frequently used system toggles such as Wi-Fi, Airplane Mode, Do Not Disturb, Bluetooth, Portrait Orientation Lock, and Bluetooth.”).

“Jailbreak aficionados had a similar feature long before iOS 7’s release thanks to the revolutionary SBSettings tweak by BigBoss. The godfather of Control Center tweaks, SBSettings came with options like customizable toggles and widgets that would later make their way to later versions of iOS (more on those below). In iOS 5 and higher, you could incorporate SBSettings’ controls into the swipe-down Notification Center. Before that, you would swipe left or right on the status bar to open up the toggles.”).

<sup>427</sup> Amboy Manalo, 60 iOS Features Apple Stole from Jailbreakers (published November 2, 2018, available at <https://ios.gadgethacks.com/how-to/60-ios-features-apple-stole-from-jailbreakers-0188093/>) (“Many early jailbreak tweaks turned out to be so innovative and useful that Apple officially incorporated them into iOS to take the iPhone’s user-friendliness to a whole new level. Every year a big new iOS software update comes out, Apple’s giving users fewer and fewer reasons to jailbreak.”).



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***C. The Tie of iOS Smartphones and Tablets to Exclusive iOS App Distribution***

281. Apple’s ability to impose the above exclusivity restraints has been enhanced by tying them (for device purchasers) to the purchase of iOS smartphones and tablets and (for developers) to the right to run their apps on those iOS devices. The exclusivity restraints discussed above in Sections A and B mean that Apple requires purchasers of iOS smartphone and tablets to use an Apple app store to install all their native iOS apps. Those exclusivity restraints thus impose a requirements tie on purchasers that ties their purchase of iOS smartphones and tablets to exclusive iOS app distribution via Apple. Those exclusivity restraints also require developers who want to run their apps on iOS smartphones and tablets to agree to exclusively distribute via Apple app stores. Those exclusivity restraints thus also impose a requirements tie on developers that ties their right to run native apps on iOS smartphones and tablets to exclusive iOS app distribution via Apple.<sup>428</sup> Without such a tie, Apple could still determine through app review which apps to approve to run on iOS (say because of security concerns) but the criteria for approval would not include whether the developer agrees to exclusive distribution of the app and IAPs through Apple and any approved app could be distributed by other app distributors as well. Apple has instead tied approving an app to run on iOS to developers agreeing to exclusive distribution of their apps and IAPs by Apple.

282. Such a requirements ties are a particularly restrictive form of tying. In antitrust economics, a seller engages in “tying” when it refuses to sell one product unless the buyer also takes another product from the seller.<sup>429</sup> A “requirements tie”

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<sup>428</sup> Those exclusivity restraints also impose a requirements tie that ties the iPod touch to iOS app and IAP distribution on the iPod touch. However, the iPod touch accounted for less than [REDACTED] of unit sales of iOS devices during the class period. See “ELOC322 iOS device units by type, year.csv”. Thus, Apple’s tying market power comes almost exclusively from the iPhone in the smartphone market and its iPads in the tablet market, and the tie to the iPod Touch contributes relatively little to Apple’s ability to impose exclusivity restraints on iOS app distribution. Apple does have relatively high profit margins on the iPod touch that could directly indicate it has market power over price. See “ELOC322 apple profit margins by device type year wide.csv”. But I have not yet seen data on the iPod touch’s market share or barriers to entry in that market. Assuming such evidence would become available at the merits stage, I would use the same sort of classwide methodology to calculate its market share and determine whether the combination of that market share and entry barriers supported an inference of market power.

<sup>429</sup> EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 409 (3d ed. 2018) (“Tying is a refusal to sell one product unless the buyer also takes another product from the seller. The product that will not be sold without the other is called the tying product, and generally it is the product in

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is a particularly restrictive type of tie because it requires the buyer to make *all* of its purchases in the tied market from the defendant.<sup>430</sup> Requirements ties are thus more restrictive than “unit-to-unit” ties, which require only that the buyer purchase a certain number of units of the tied product from the defendant each time it purchases one unit of the tying product from the defendant.

283. For reasons already discussed in Part II, Sections B & E, Apple has had dominant market shares and strong market power in the tying markets for smartphones and tablets. Apple’s market shares and market power in these tying markets are marketwide conclusions that are common to the Developer Class because those conclusions, and the methods and data needed to reach them, would be the same for all class members.

284. For reasons already described above in Part III, Sections A and B, these tying restraints foreclose 100% of the tied iOS app distribution market. To be sure, by violating those foreclosing restraints, some fringe firms have been able to engage in some minor distribution of iOS apps. As discussed above in Part III, Section B, these include TuTuApp (an app store that uses Enterprise certificates in violation of Apple’s agreements); AltStore (an app store that attempts to distribute apps through free Xcode provisioning); and Cydia (a jailbreak app store). But as also discussed above, Apple’s exclusivity restraints have limited rival distribution of iOS apps and IAPs to very minor levels.<sup>431</sup> Further, for reasons already discussed in the introduction to Part III, the foreclosure share in the tied market would be [REDACTED] even if one incorrectly defined a broader tied market for app distribution on any mobile device. The extent to which this tie foreclosed this tied market is a marketwide conclusion that is common to the Developer Class because the conclusions and methods and data needed to reach that conclusion would be the same for all class members.

285. As discussed in Part VI, this tying restraint has no procompetitive efficiency. Again, whether such procompetitive efficiency justifications exist is a

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which the defendant has the greatest market power. The tied product is the one that buyers have to take from the seller to get its tying product”).

<sup>430</sup> Elhauge, *Rehabilitating Jefferson Parish: Why Ties Without a Substantial Foreclosure Share Should Not Be Per Se Legal*, 80 ANTITRUST LAW JOURNAL 463, 472 (2016) (a “requirements tie [is] a tie that requires the buyer to make all its tied product purchases from the defendant.”); Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARVARD LAW REVIEW 397, 409-11 (2009).

<sup>431</sup> See Part II, Section A (market shares); Part III, Section B (exclusivity restraints).

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factual conclusion that is necessarily common to the class, and the methods and evidence necessary to reach that conclusion are also common to the class.

286. The one remaining issue regarding this tie is to establish that the tying products (iOS smartphones and tablets) are separate from the tied product (iOS app distribution). In antitrust economics, whether two products are “separate” for the purposes of analyzing a requirements tie depends solely on the economic facts that are relevant to whether the requirement tie can anticompetitively harm consumers. The economic literature (including the treatise on tying that I co-authored) has identified a set of tests that can be used to determine whether two products should be considered “separate” for the purposes of tying analysis.<sup>432</sup>

287. Here, the evidence indicates that Apple’s iOS devices are “separate” from the iOS app distribution for the purpose of analyzing Apple’s requirements tie because:

- a. It would be feasible for Apple not to impose the requirements tie;
- b. Some buyers and developers would find it desirable to obtain the products separately (i.e., for buyers to obtain their iOS devices and iOS apps from different firms, and for developers to obtain the right to run their apps on iOS devices without exclusively distributing those iOS apps via Apple); and
- c. The challenged requirements tie is *not* commonplace in other markets.

288. However one resolves these issues, the conclusion about whether these are separate products is necessarily common to the class. The conclusion would not vary between class members, and none of the evidence or analysis I rely upon to reach this conclusion is specific to any individual class member.

1. *It Is Feasible for Sellers of Mobile Devices Not to Impose the Requirements Tie*

289. Two products are not “separate” for the purpose of analyzing a requirements tie if it would not be *feasible* for sellers of the tying product not to impose the requirements tie.<sup>433</sup> Here, not imposing the requirements tie would mean selling a device and/or a license to its OS without requiring that the consumer install apps on that device and/or OS only from the seller’s app distribution platforms, and

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<sup>432</sup> X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1744-50 (1996).

<sup>433</sup> X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶ 1743b (1996) (“Threshold proof of seller ability to unbundle should also be required. If unbundling is not physically or economically feasible, there is no point in ordering firms to unbundle.”).

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would mean allowing developers to run their apps on that seller’s device and/or OS without requiring the developers to distribute their apps exclusively via the seller’s app store. History shows that not imposing such a requirements tie is in fact feasible.

290. There are numerous examples of similarly situated firms separately selling smart mobile devices and app distribution. For example, Google sells only 6% of domestic Android smartphones,<sup>434</sup> but its Google Play Store accounts for over 90% of Android app downloads outside of China.<sup>435</sup> Conversely, Samsung sells 60% of domestic Android smartphones,<sup>436</sup> but its Galaxy Store accounts for less than 10% of Android app distribution outside of China. Thus, it clearly has been feasible not to tie the ability of consumers to buy Android mobile devices, and the right of developers to run apps on Android mobile devices, to exclusive distribution either by the device maker (like Samsung) or the device’s OS provider (Google).

291. Likewise, it is feasible more generally not to tie access to an OS to exclusive distribution of apps on that OS. Google, which provides the OS for all Android phones, does not require users of Android phones, or developers who want their apps to run on Android, to use Google’s app distribution platform (Google Play).<sup>437</sup> Microsoft, the developer of the Windows operating system, does not require Windows users or app developers to use its Windows app distribution platform (the Microsoft Store).<sup>438</sup> And Apple itself does not require purchasers of

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<sup>434</sup> Statcounter, *Mobile Vendor Market Share United States of America* (available at <https://gs.statcounter.com/vendor-market-share/mobile/united-states-of-america>, last accessed May 2, 2021) (for April 2021, the market shares are: Apple: 59.13%, Samsung: 24.47%, Google: 2.33%). This implies that Google’s share of non-iOS mobile device sales is  $2.33\% / (100\% - 59.13\%) = 6\%$ .

<sup>435</sup> July 18, 2018 European Commission Decision in Case AT.40099 (Google Android), at Table 5. The commission decision redacted the Google Play Store’s exact share, instead reporting Google’s share as “90-100%”.

<sup>436</sup> Statcounter, *Mobile Vendor Market Share United States of America* (available at <https://gs.statcounter.com/vendor-market-share/mobile/united-states-of-america>, last accessed May 2, 2021) (for April 2021, the market shares are: Apple: 59.13%, Samsung: 24.47%, Google: 2.33%). This implies that Samsung’s share of non-iOS (i.e., non-Apple) mobile device sales is  $24.47\% / (100\% - 59.13\%) = 60\%$ .

<sup>437</sup> For example, Android device users or developers could distribute via the Samsung Galaxy Store. However, although Google does not impose the same sort of tie as Apple, Google does use other ties and restraints to foreclose app distribution on Android phones. *See infra* Appendix A.

<sup>438</sup> Windows allows users to choose whether to install apps only from the Microsoft Store. *See* Microsoft, *Change your app recommendation settings in Windows 10* (available at <https://support.microsoft.com/en-us/windows/change-your-app-recommendation-settings-in-windows-10-f21b5c60-e996-4ee4-c2cf-b4a90c0bef9b>



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macOS devices, or developers of apps that run on them, to use its macOS app distribution platform (the Mac App Store).<sup>439</sup>

292. Further, when it was more common for users to jailbreak their iOS devices, Apple faced some competition in the iOS app distribution market from jailbreak-based app distributors like Cydia. Although hardly any iOS users jailbreak their phones anymore because Apple has made it so technically difficult, millions of iOS devices used Cydia each week in 2010.<sup>440</sup> This directly shows that separating access to iOS devices from iOS app distribution is feasible for sellers.

*2. Many Buyers and Developers Desire to Obtain Access to Mobile Devices and App Distribution from Different Firms*

293. Two products are not “separate” for the purpose of analyzing a requirements tie if there is no buyer demand to purchase them from separate firms.<sup>441</sup> Some mobile device buyers clearly do desire to purchase mobile devices and app distribution from different firms because many do so when given the choice. As just discussed, the most successful Android app distributor (Google) is different from the most successful Android mobile device seller (Samsung), which means that Android mobile device users usually prefer to obtain their Android apps from a different firm than the one from which they obtained their Android device. This same evidence shows that many developers prefer to obtain app distribution from a firm different than the mobile device maker.

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<sup>439</sup> macOS lets users choose whether to install apps only from the Mac App Store. *See* Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>) (“By default, the security and privacy preferences of your Mac are set to allow apps from the App Store and identified developers. For additional security, you can chose to allow only apps from the App Store.”).

<sup>440</sup> Reed, Albergotti, *The ‘app store’ before there was an App Store wants to liberate your iPhone ... again* (published December 10, 2020, available at <https://www.washingtonpost.com/technology/2020/12/10/cydia-apple-lawsuit/>) (“There were so many people using [Cydia] that [Freeman, the founder of Cydia] estimated half of early iPhone customers must have been ‘jailbreaking’ their phones to take advantage of the additional features it offered. In 2010, Freeman told the Washington Post that Cydia had 4.5 million people searching for apps every week. . . Cydia’s revenue peaked in 2011 and 2012, when it brought in about \$10 million, Freeman said. Cydia, like Apple, charged developers a commission on sales.”).

<sup>441</sup> X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1743a (1996) (“If no buyers want the unbundled items, then [more detailed inquiry] is pointless. Nothing useful could be accomplished by condemning the bundle, because no unbundled items would be purchased. Nor would anything useful be accomplished if the number of buyers interested in buying unbundled comprise an insignificant share of the tied market.”).

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294. More generally, users of operating systems for general-purpose computing devices regularly obtain apps for those operating systems from some method other than the operating system developer’s app distribution platform. For example, macOS users download macOS apps from outside Apple’s macOS App Store 58% of time.<sup>442</sup> Similarly, [REDACTED]<sup>443</sup> This evidence likewise shows that many developers prefer to obtain app distribution from a firm different than the firm that makes the general-purpose computing device.

295. Further, for iOS devices, millions of users have jailbroken their iOS devices and chosen to use rival app distributors.<sup>444</sup> Similarly, over a million users have downloaded the AltStore (which attempts to use free Xcode provisioning to distribute apps) so that they can install iOS apps that are not available on the App Store.<sup>445</sup> This evidence shows that, for iOS devices in particular, there are many buyers who desire to obtain their apps and devices from different firms. Likewise, this evidence shows that, when they can escape the tie, many developers prefer to use iOS app distributors other than Apple.

### 3. *It Is Common for Firms Not to Impose the Requirements Tie*

296. When separating products is feasible and desired by some buyers, the fact that many firms in similar markets do not use the alleged requirements tie

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<sup>442</sup> SetApp, *Annual Mac Developer Survey* (2019) (available at <https://cdn.setapp.com/blog/images/Annual-Setapp-Mac-Market-Survey-2019.pdf>) (survey of 812 macOS developers. It found that macOS developers earn on average 58% of their total revenue from outside the Mac App Store.).

<sup>443</sup> MSFT EPIC 00000348 (2018 internal Microsoft presentation stating that [REDACTED]

[REDACTED]).

<sup>444</sup> See Reed, Albergotti, *The ‘app store’ before there was an App Store wants to liberate your iPhone ... again* (published December 10, 2020, available at <https://www.washingtonpost.com/technology/2020/12/10/cydia-apple-lawsuit/>) (“There were so many people using [Cydia] that [Freeman, the founder of Cydia] estimated half of early iPhone customers must have been ‘jailbreaking’ their phones to take advantage of the additional features it offered. In 2010, Freeman told the Washington Post that Cydia had 4.5 million people searching for apps every week. . . Cydia’s revenue peaked in 2011 and 2012, when it brought in about \$10 million, Freeman said. Cydia, like Apple, charged developers a commission on sales.”);

<sup>445</sup> Riley Testut, *Thoughts on the App Store* (published October 14, 2020, available at <http://rileytestut.com/blog/2020/10/14/thoughts-on-app-store/>) (“AltStore has been downloaded by over 1 million people to sideload over 100 different apps to their iOS devices, and it’s still growing every day!”).



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indicates that the tying and tied products are “separate,” and would so indicate even if many other firms did use it.<sup>446</sup> If it is common for firms to abstain from a requirements tie in *competitive* markets, that strongly indicates that it is efficient for firms not to impose such a requirements tie and thus indicates separate products. The reason is that, in competitive markets, firms cannot survive while using inefficient strategies.<sup>447</sup> If it is common for firms to abstain from a requirements tie in *noncompetitive* markets, that also indicates that it is efficient not to impose a requirements tie and thus indicates separate products, though the inference about efficiency is somewhat weaker because weaker competition could allow inefficient firms (or inefficient strategies) to survive longer.<sup>448</sup> In contrast, when firms with market power *impose* a requirements tie, that does not provide any indication about the efficiency of the requirements tie because firms with market power can profit from requirements ties anticompetitively even if the practice is inefficient.<sup>449</sup>

297. Many rival makers of mobile devices or providers of OSs do not use a requirements tie like Apple’s to foreclose the distribution of apps; indeed, abstaining from such requirements ties appears to be the predominant practice. Samsung, the most successful seller of mobile devices that use the Android operating system, does not require purchasers of its devices, or developers who want to run apps on its devices, to use its app distribution platform (the Galaxy Store).<sup>450</sup> Further, as noted above, Google, which provides the OS for all Android phones, does not require users of Android phones, or developers who want their apps to run on Android, to use Google’s app distribution platform (Google Play).<sup>451</sup> Microsoft does not require Windows users or app developers to use its Windows app distribution platform (the

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<sup>446</sup> X AREEDA, ELHAUGE & HOVENKAMP, ANTITRUST LAW ¶1744e (1996) (suppose “many sellers in the competitive analogue sell the items unbundled but many others sell them only bundled ... the market test indicates separate products on balance.”).

<sup>447</sup> AREEDA & ELHAUGE, X ANTITRUST LAW ¶1744g (1996) (“unbundling in a noncompetitive market analogue implies separate products under the market practice tests. The inference is somewhat weaker than when [un]bundling occurs in competitive markets that require efficiency for survival.”).

<sup>448</sup> *Id.*

<sup>449</sup> AREEDA & ELHAUGE, X ANTITRUST LAW, ¶1744g (1996) (“Sometimes the relevant market analogues are monopolies or oligopolies. Bundling in such a noncompetitive market carries no single product implication. Such bundling may reflect efficiencies. But it may also reflect tying that increases market power exploitation or derives profits anticompetitively.”).

<sup>450</sup> Samsung smartphones come preinstalled with not only the Samsung Galaxy Store, but also the Google Play Store. <https://www.t-mobile.com/support/devices/android/samsung-galaxy-s20-ultra-5g/pre-installed-apps-samsung-galaxy-s20-ultra-5g>.

<sup>451</sup> See *supra* note 437.

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Microsoft Store).<sup>452</sup> And Apple itself does not require purchasers of macOS devices, or developers of apps that run on them, to use its macOS app distribution platform (the Mac App Store).<sup>453</sup>

**IV. RESTRAINING COMPETITION IN THE iOS APP DISTRIBUTION MARKET  
ANTICOMPETITIVELY INFLATED APPLE’S AVERAGE PROFIT-MAXIMIZING  
COMMISSION**

298. By completely prohibiting *all* competition in the iOS app distribution market, Apple has caused the maximum possible amount of anticompetitive harm in this market. This Part shows that eliminating (essentially) all competition in the iOS app distribution market anticompetitively inflated Apple’s profit-maximizing average commission for its iOS App Store. Specifically, it shows that:

- A. Apple would have faced significantly more competition from rival iOS app distributors and direct distribution of iOS apps but for its challenged conduct.
- B. The additional competition in the but-for world would have reduced Apple’s profit-maximizing commission.
- C. My conclusion that Apple’s average commission would have been lower in the but-for world is consistent with Prof. Economides’ and Prof. Evans’ estimates of the average commission that would have prevailed in the iOS app distribution market but for Apple’s anticompetitive conduct.

299. All the evidence, methodologies, and conclusions in this Part are common to the developer class. None of the evidence I rely upon in this Part is specific to any individual developer. Further, all the methodologies and conclusions in this Part pertain to the effect of competition on the App Store’s *average* profit-maximizing commission, and thus are inherently common to the developer class. Below, in Part V, I show that anticompetitively inflating the average App Store profit-maximizing commission harmed all class members.

***A. Multiple Rival iOS App Distributors Would Have Entered the Market But For Apple’s Conduct***

300. One would expect multiple rivals to have entered the iOS app distribution market in the but-for world because the barriers to entering the market

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<sup>452</sup> See *supra* note 438.

<sup>453</sup> See *supra* note 439.



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in the but-for world would be low in relation to the profits that new entrants would earn. Here, the main barrier to entry in the iOS app distribution market in the actual world is Apple’s anticompetitive conduct. As detailed in Part III, Apple uses contractual exclusivity restraints reinforced by technological restraints to prevent rivals from entering the market for iOS app distribution market. Indeed, Apple’s anticompetitive conduct is such a strong barrier to entry that *no* firms have been able to wrest a significant share of the iOS app distribution market from Apple over the long run.<sup>454</sup>

301. In contrast, but for Apple’s challenged conduct, Apple’s exclusivity restraints would not have prevented rivals from distributing iOS apps and digital IAPs. Other barriers to entry would still have existed in the but-for world, but they are low entry barriers that would not have prevented entry into the market in the but-for world. These other barriers to entry include:

- a. the cost and time of creating the app distribution software;
- b. the upfront cost of setting up a large set of servers for storing the data necessary to install the apps, and distributing that data to consumers;
- c. initial advertising and marketing investments, so that consumers and developers are aware of the existence of the new firm; and
- d. indirect network effects, which make new app distributors with fewer developers less appealing to consumers, and vice versa. To overcome the indirect network effect advantage of established firms, new app distributors would likely have to offer significantly better terms to developers and/or consumers, such as lower commissions for developers or subsidized app prices for consumers.

302. Apple’s economic experts have consistently opined that that the barriers to entry in app distribution/transaction markets are “low.”<sup>455</sup> It therefore appears undisputed that barriers to entry in the iOS app distribution market would have been low in the but-for world. The following sections explain why I agree with

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<sup>454</sup> See *supra* Part II.A.

<sup>455</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶115 (“As Exhibit 1 shows, many new online platforms . . . have entered since the App Store launched. Not only do entry barriers seem low, but there are no obvious barriers to the expansion of output by other platforms if the app Store were to engage in monopolist price increases. The online platform world is not like brick-and-mortar retailing: output expansion does not require building and staffing new physical facilities.”); Hitt 2021-02-16 report in *Epic v. Apple* ¶114 (“Barriers to entry are low, as exhibited by the entry of many other digital transaction platforms in the recent past.”); Lafontaine 2021-02-16 report in *Epic v. Apple*. ¶118 (“Professor Schmalensee explains that two-sided platforms in general can quickly achieve much success.”).

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Apple’s economic experts that the barriers to entry in the iOS app distribution market in the but-for world would have been low in relation to the profits potential entrants could earn and why one would expect a significant number of entrants in the but-for world.

303. My conclusion that a significant number of rival iOS app distributors would have entered the market but for Apple’s anticompetitive conduct is consistent with the expert testimony of Epic’s economic expert Prof. Evans, who opined that it would be “very conservative” to assume that two rivals would have entered the iOS app distribution market in the but-for world, and that each would have attained a 25% market share.<sup>456</sup>

*1. The iOS App Distribution Market’s High Profit Margins Would Have Incentivized Entry But for Apple’s Exclusivity Restraints*

304. New firms are more likely to enter a market the more profitable the market is.<sup>457</sup> When a market is profitable and new entry is possible, additional firms will keep entering the market until it would no longer be profitable for an additional firm to enter the market. Typically, the profitability of a market decreases the more firms enter a market because (1) each firm earns a smaller share of the market; and (2) competition between the firms tends to reduce profit-maximizing prices. Consequently, the profitability of a market when there is only a single competitor (a 100% monopolist) is one of the main determinants of how many competitors one would expect to enter the market. Put simply, if the only firm currently competing in a market is earning enormous profits, other firms will attempt to enter so that they can earn a share of those enormous profits too. In contrast, if the only firm competing in a market is earning hardly any profits, then there is little incentive for other firms to enter the market.

305. Here, the iOS app distribution market is abnormally profitable by any measure. The U.S. storefront of the iOS app store collected [REDACTED] in

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<sup>456</sup> Evans 2021-02-16 Report in Epic v. Apple. ¶591 (“When competition is not restricted we observe . . . that many app distributors emerge. For my analysis here, however, I have taken a very conservative approach and considered a more competitive, but still highly concentrated, iOS app distribution market in which the App Store has a 50 percent share, and two entrants each have a 25 percent share.”).

<sup>457</sup> PINDYCK & RUBINFELD, MICROECONOMICS 377 (8<sup>th</sup> ed. 2013) (“Large short-run profits can induce new firms to enter an industry”); CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 116 (4<sup>th</sup> ed. 2005) (“In most markets, positive economic profits would attract new entrants.”).

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commissions from the start of the class period (June 4, 2015) to the end of its currently produced transaction data (September 30, 2019).<sup>458</sup> Similarly, the iOS App Store’s profit margin (including a deduction for recurring fixed costs) was exceptionally high, averaging [REDACTED] from 2018-2020.<sup>459</sup> Because the iOS app distribution market was so profitable, other firms would have had a strong incentive to enter the market and earn a share of those profits if their entry had not been blocked by Apple’s exclusivity restraints.

*2. Many Firms Would Have Been Well-Positioned to Enter the iOS App Distribution Market in the But-For World*

306. This section provides examples of the types of firms that would have been most likely to enter the iOS app distribution market in the but-for world. In general, these are firms that: (a) are legally challenging Apple’s anticompetitive conduct with the goal of entering the iOS app distribution market, such as Epic and Cydia; and/or (b) are large companies with significant pre-existing experience in app distribution on other software platforms, such as Epic, Google, Amazon, and Valve. Further, many iOS developers would likely self-distribute their apps in the but-for world, given how common self-distribution is in other software platforms for general-purpose computing devices (such as macOS and Windows).

307. To be clear, this is neither an exhaustive list of every firm that could possibly enter the iOS app distribution market, nor a list of firms that would surely enter the iOS app distribution market in the but-for world. My conclusion about the effect of Apple’s challenged conduct on its profit-maximizing commission does *not* depend on *which* particular firms would have entered the iOS app distribution market in the but-for world. Instead, my conclusion depends on the premise that *a significant number* of significant rivals would have entered the iOS app distribution market in the but-for world. The existence of at least five firms that were well-positioned to enter the iOS app distribution market but for Apple’s conduct helps establish that a significant number would enter in the but-for world.

308. **a. Epic.** Epic Games launched its “Epic Games Store” app distribution platform for the Windows and macOS operating systems in December 2018.<sup>460</sup> Epic

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<sup>458</sup> “ELOC716 Apple iOS app distribution commissions, start of class period to Sep 2019.txt”.

<sup>459</sup> See *supra* Part II.D.2.a.

<sup>460</sup> Tim Sweeney, *Announcing the Epic Games store* (published December 4, 2018, available at <https://www.unrealengine.com/en-US/blog/announcing-the-epic-games-store>) (“Soon

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Games has explicitly stated that it would enter the iOS app distribution market but for Apple’s challenged conduct, and Epic is actively suing Apple with the goal of ultimately entering the iOS app distribution market.<sup>461</sup> Epic could differentiate its iOS app distribution platform from Apple’s not only by providing a lower commission (Epic charges only a 12% commission), but also by providing cross-platform purchases. Epic already provides cross-platform purchases for Windows and macOS; if a consumer purchases a game from the Epic Game store, then the consumer can install the application on both their Windows devices and their macOS devices (assuming the developer has released both Windows and macOS versions). In contrast, purchasing a game from Apple’s App Store only gives a consumer the right to download and install that game on iOS devices; if the user later switches to an Android device, he would have to re-purchase that same game from a different Android app distributor to play it on their new Android device.

309. **b. Cydia.** Cydia was one of the first firms to attempt to enter the iOS app distribution market.<sup>462</sup> Because Apple has always prevented users from installing iOS apps outside of the App Store (and excludes rival iOS app distributors from the App Store), Cydia’s app marketplace catered to users with “jailbroken” iOS devices.<sup>463</sup> As discussed in Part III, Apple has always restrained rival iOS app distribution by using a combination of contractual and technical restraints, including ones that restrained jailbreaking. In the early years, Apple’s restraints on jailbreaking were not strong enough to prevent millions of iOS devices from using Cydia each week in 2010.<sup>464</sup> But Apple later tightened its restraints, with the result

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we’ll launch the Epic Games store . . . the store will launch with a hand-curated set of games on PC and Mac, and then it will open up more broadly to other games and to Android and other open platforms throughout 2019.”); Charlie Hall, *The Epic Games Store is live, here’s all the titles it will have for sale* (published December 6, 2018, available at <https://www.polygon.com/2018/12/6/18129978/epic-games-store-launch-games-list-mac-os-windows-pc-tga-2018>) (“The launch of the Epic Games Store . . . has been moved up to tonight.”).

<sup>461</sup> Epic v. Apple Complaint ¶89 (“But-for Apple’s restrictions, would-be competing app distributors, such as Epic, could develop and offer iOS-compatible app stores . . .”).

<sup>462</sup> Cydia v. Apple Complaint ¶9.

<sup>463</sup> See *supra* Part III.B.4.

<sup>464</sup> Reed, Albergotti, *The ‘app store’ before there was an App Store wants to liberate your iPhone ... again* (published December 10, 2020, available at <https://www.washingtonpost.com/technology/2020/12/10/cydia-apple-lawsuit/>) (“There were so many people using [Cydia] that [Freeman, the founder of Cydia] estimated half of early iPhone customers must have been ‘jailbreaking’ their phones to take advantage of the additional features it offered. In 2010, Freeman told the Washington Post that Cydia had 4.5 million people searching for apps every week. . . Cydia’s revenue peaked in 2011 and 2012, when it brought in about \$10 million, Freeman said. Cydia, like Apple, charged developers a commission on sales.”).



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that hardly any iOS users jailbreak their phones anymore, and Cydia’s revenue peaked at \$10 million in 2011-12 and has fallen since.<sup>465</sup> But for Apple’s challenged conduct, Cydia would have been able to compete more fully in the iOS app distribution market by offering an alternative app distribution platform for all iOS devices, not just the limited number of jailbroken devices. Indeed, the fact that Cydia was able to successfully enter the market when the only sales available to it were on a limited number of jailbroken devices means that in the but-for world Cydia would have been even more able to enter because it could have spread the entry costs across many more sales.

310. **c. Google.** Google entered the Android app distribution market in 2008.<sup>466</sup> Google’s Android app distribution platform is named the “Google Play Store,” and currently has a 90-100% share of Android app downloads outside of China.<sup>467</sup> Because Google already operates the Google Play Store for the Android operating system, it already has experience creating an app distribution platform, reviewing apps, and distributing millions of apps to mobile device users every day. Google would therefore have been well-positioned to enter the iOS app distribution market in the but-for world. Further, the fact that Google already operates an Android app distribution platform would have allowed Google to differentiate itself from Apple by offering cross-platform purchases; i.e., by allowing a user that purchases an app from Google to download that app on both their iOS devices and their Android devices. In contrast, currently if a consumer bought an app from Apple’s iOS app store and later switched to an Android phone, the consumer would have to re-purchase that app from an Android marketplace in order to use it on their Android phone.

311. **d. Amazon.** Amazon already competes in the Android app distribution market with its “Amazon App Store,” which at one point in time was the second-

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<sup>465</sup> *Id.*; *supra* Part III.B.4.

<sup>466</sup> Android Developers Blog, Android Market: Now available for users (published October 22, 2018, available at <https://android-developers.googleblog.com/2008/10/android-market-now-available-for-users.html>). Google changed the name of its Android app distribution platform from “Android Market” to the “Google Play Store” in 2012. Joshua Topolsky, *Hello, Google Play: Google Launches sweeping revamp of app, book, music, and video stores* (published March 6, 2012, available at <https://www.theverge.com/2012/3/6/2848223/google-play-store-rebranded-android-market>).

<sup>467</sup> July 18, 2018 European Commission Decision in Case AT.40099 (Google Android), at Table 5. The commission decision redacted the Google Play Store’s exact share, instead reporting Google’s share as “90-100%”.

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most successful Android app platform (after Google’s play store).<sup>468</sup> Because Amazon already operates an app distribution platform for the Android operating system, it has experience and infrastructure that would ease its entry into the iOS app distribution market. Amazon’s iOS app distribution platform could also potentially differentiate itself from Apple’s by offering cross-platform purchases between Android and iOS. Amazon would therefore have been well-positioned to enter the iOS app distribution market in the but-for world.

312. **e. Valve/Steam.** Valve operates Steam, an app distribution platform that focuses on games, and currently works on the Windows, macOS, and Linux operating systems.<sup>469</sup> Steam, like the Epic Game Store, already provides cross-platform purchases; once consumers purchase a game from Steam, they can download and install that game on both Windows and macOS devices. Valve/Steam thus would have been well-positioned to enter the iOS app distribution market in the but-for world.

*3. In Markets Without Similar Exclusionary Conduct, There Are Typically Multiple App Distributors for General Purpose Computing Operating Systems*

313. In markets that are similar to the iOS app distribution market, but are not distorted by similar exclusionary conduct, there are typically numerous app distributors and a significant amount of self-distribution. The most similar markets to the iOS app distribution market are other app distribution markets for general purpose computing devices, such as the app distribution markets for the Android, Windows, and macOS, operating systems.<sup>470</sup>

314. Although the Android app distribution market is distorted by anticompetitive conduct similar to what Apple has done here,<sup>471</sup> the Windows and

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<sup>468</sup> July 18, 2018 European Commission Decision in Case AT.40099 (Google Android), at Table 5 (showing that the Amazon Appstore’s “Worldwide (excluding China) shares of Android App Distributors) was 5-10% in 2011, and was 0-5% from 2012-2016.).

<sup>469</sup> Steam Hardware and Software Survey for March 2021, available at <https://store.steampowered.com/hwsurvey/Steam-Hardware-Software-Survey-Welcome-to-Steam?platform=combined> (Steam operating system shares: 96% for Windows, 3% for macOS X, 1% for Linux).

<sup>470</sup> Windows and macOS are by far the two most popular operating systems for personal desktop computers. *See* StatCounter, Desktop Operating System Market Share Worldwide (accessed April 15, 2021, available at [gs.statcounter.com/os-market-share/desktop/worldwide](https://gs.statcounter.com/os-market-share/desktop/worldwide)) (listing the operating system market shares as 75.55% for Windows, 16.5% for macOS X, 2.09% for Chrome, and 1.97% for Linux. The remaining 3.89% is “unknown.”).

<sup>471</sup> *See infra* Appendix A.



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macOS distribution markets are relatively unrestrained because they have no ban on rival distribution of apps. On Windows and macOS, users are free to install applications from any source, without having to circumvent restraints via “jailbreaking” or by “sideloading” through the use of “development tools” that are designed to instead help developers test apps they are working on.<sup>472</sup> Consequently, in both the Windows and macOS app distribution markets, there is vibrant competition and the operating systems’ developers do not have monopoly shares of the markets, unlike in the iOS app distribution market.<sup>473</sup> For example, the Windows app distribution market includes at least the following five firms that distribute other developers’ apps: (1) Steam;<sup>474</sup> (2) Epic Game Store;<sup>475</sup> (3) GOG;<sup>476</sup> (4) Microsoft

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<sup>472</sup> Windows by default allows users to install apps from any source, rather than just the Microsoft Store. Windows users can elect to install apps only from the Microsoft Store if they wish. See Microsoft, *Change your app recommendation settings in Windows 10* (available at <https://support.microsoft.com/en-us/windows/change-your-app-recommendation-settings-in-windows-10-f21b5c60-e996-4ee4-c2cf-b4a90c0bef9b>). By default, macOS allows users to install any app that Apple has “notarized,” even if it was not distributed by the Mac App Store. See Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>) (“By default, the security and privacy preferences of your Mac are set to allow apps from the App Store and identified developers. For additional security, you can chose [sic] to allow only apps from the App Store”).

<sup>473</sup> Available data indicates that Apple’s Mac App Store accounts for less than half of revenue from the sales of macOS apps. See SetApp, *Annual Mac Developer Survey* (2019) (available at <https://cdn.setapp.com/blog/images/Annual-Setapp-Mac-Market-Survey-2019.pdf>) (survey of 812 macOS developers finding that macOS developers earn on average 58% of their total revenue from outside the Mac App Store.). The Microsoft Store has only a 2% market share in Windows app distribution market. See MSFT EPIC 00000348 (2018 internal Microsoft presentation stating that [REDACTED]”).

<sup>474</sup> See Steam, *Steam Direct: Joining The Steamworks Distribution Program* (available at <https://partner.steamgames.com/steamdirect>) (Steam Direct [“provides a streamlined, transparent, and affordable route for new game developers from anywhere in the world to bring games to Steam.”]). Steam provides app distribution for the Windows, macOS, and Linux operating systems. Steamworks Documentation, *Platforms* (available at <https://partner.steamgames.com/doc/store/application/platforms#:~:text=want%20to%20support.%,Microsoft%20Windows,Windows%20XP%20and%20Windows%20Vista>).

<sup>475</sup> See Epic Game Store, *About* (available at <https://www.epicgames.com/store/en-US/about>). The Epic Game Store distributes apps for the Windows and macOS operating systems. See Epic Games, *FAQ* (available at <https://www.epicgames.com/site/en-US/epic-games-store-faq>) (“The Epic Games Store is a curated digital storefront for PC and Mac”).

<sup>476</sup> See GOG, *Submit your game to GOG.com* (available at <https://www.gog.com/indie>); GOG, *Storefront* (available at <https://www.gog.com/games?page=1&sort=popularity>). GOG has games available for Windows, macOS, and Linux. *Id.*



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Store;<sup>477</sup> and (5) itch.io.<sup>478</sup> Further, all of these Windows app distributors face competition from self-distribution of Windows apps; Prof. Economides’ analysis shows that developers such as Epic, Blizzard, EA, Tencent, and Steam have self-distributed [REDACTED]’ worth of Windows apps.<sup>479</sup> All of these Windows app distributors also distribute macOS apps, with the exception of the Microsoft Store.<sup>480</sup> And all of these macOS app distributors face competition from macOS developers who self-distribute their apps.<sup>481</sup>

***B. The Additional Competition from Rival iOS App Distributors in the But-For World Would Have Reduced Apple’s Profit-Maximizing Commission***

315. Basic economics shows that, all else being equal, prices in a market decrease as the number of competitors in the market increases.<sup>482</sup> Thus, economists have long recognized that firms can anticompetitively inflate prices by excluding

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<sup>477</sup> The Microsoft Store includes many Windows apps made by other developers, such as Roblox (<https://www.microsoft.com/en-us/p/roblox/9nblgggzm6wm?activetab=pivot:overviewtab>); and Gravit Designer (<https://www.microsoft.com/en-us/p/gravit-designer/9n3vtcz9m646?activetab=pivot:overviewtab>).

<sup>478</sup> Itchi.io primarily distributes games made by small independent developers, and lets the developer choose how much revenue to share with the platform (by default 10%). *See* Itchi.io, *Introducing open revenue sharing* (available at <https://itch.io/updates/introducing-open-revenue-sharing>).

<sup>479</sup> *See* Economides Opening Class Report Table 4.

<sup>480</sup> *See supra* note 474 (Steam distributes Windows, macOS, and Linux apps); note 475 (Epic Game Store distributes Windows and macOS apps); note 476 (GOG distributes Windows, macOS, and Linux games); <https://itch.io/games/platform-osx> (itch.io distributes macOS games).

<sup>481</sup> *See infra* Part I.B.5.a (presenting evidence that macOS developers earn similar revenues when they distribute their apps only directly, rather than also through the Mac App Store).

<sup>482</sup> PINDYCK & RUBINFELD, MICROECONOMICS 376 (8th ed. 2013) (“The second determinant of a firm’s demand curve—and thus of its monopoly power—is the number of firms in its market. Other things being equal, the monopoly power of each firm will fall as the number of firms increases: As more and more firms compete, each firm will find it harder to raise prices and avoid losing sales to other firms. What matters, of course, is not just the total number of firms, but the number of ‘major players’—firms with significant market share.”); CARLTON & PERLOFF, MODERN INDUSTRIAL ORGANIZATION 210-211 (4th ed. 2005) (“Entry Lowers Prices”. Table 7.2 shows how the profit-maximizing price in a Cournot monopolist market decreases as the number of firms in the market increases. Example 7.2 describes how the entry of new firms was “very likely responsible” for significant airline prices decreasing “as much as 70 percent”); *id.* at 244 (“Theories on competitive and noncompetitive markets hold that the less competition a firm faces, the greater its *market power*: the ability to set price profitably above marginal cost.”) (emphasis in original).



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rivals from competing in the market.<sup>483</sup> Indeed, economists have shown that a defendant can anticompetitively inflate prices merely by slowing the growth of rivals or increasing their costs, even if the defendant does not force rivals to completely exit the market.<sup>484</sup> Economists recognize that eliminating even a single significant rival can anticompetitively inflate prices.<sup>485</sup> And here, Apple has achieved a rare feat: it has excluded *every* significant rival in the relevant market.

316. Apple’s economic experts in the *Epic* litigation have acknowledged that it would be “nonsensical” and “defy logic” for the entry of additional iOS app distributors to *increase* Apple’s profit-maximizing commission.<sup>486</sup> The relevant question is therefore whether Apple’s average commission would decrease or stay the same in the but-for world. In most standard economic models that economists use to simulate (i.e. predict) the price effects of mergers or anticompetitive conduct, profit-maximizing prices decrease when more rivals enter the market.<sup>487</sup> In other

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<sup>483</sup> EINER ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS 371 (3d ed. 2018) (“the major anticompetitive concern is that [exclusive dealing] agreements might foreclose[] enough of the market to rivals as to impair competition. Such foreclosure might impede rival efficiency, entry, existence, or expandability, any of which can anticompetitively increase the market power of the foreclosing firm.”); Ordover & Saloner, *Predation, Monopolization and Antitrust*, Chapter 9 in HANDBOOK OF INDUSTRIAL ORGANIZATION, VOLUME I (1989) at 541 (“As part of profit maximization, a firm’s management can engage in potentially anticompetitive conduct [by] engag[ing] in practices that disadvantage actual rivals, without necessarily causing their exit, but which relax the competitive constraint exercised by them over the dominant firm.”).

<sup>484</sup> AREEDA & HOVENKAMP, XI ANTITRUST LAW ¶1802c (3d ed. 2011) (“suppose an established manufacturer has long held a dominant position but is starting to lose market share to an aggressive young rival. A set of strategically planned exclusive-dealing contracts may slow the rival’s expansion by requiring it to develop alternative outlets for its product, or rely at least temporarily on inferior or more expensive outlets. Consumer injury results from the delay that the dominant firm imposes on the smaller rival’s growth.”).

<sup>485</sup> See, e.g., DOJ/FTC Horizontal Merger Guidelines §7.1 (2010) (“eliminating a maverick firm [i.e., a “firm that plays a disruptive role in the market to the benefit of consumers”] in a market vulnerable to coordinated conduct is likely to cause adverse coordinated effects.”).

<sup>486</sup> See, e.g., Lafontaine 2021-03-15 Rebuttal Report in *Epic v. Apple* ¶246 (“... the nonsensical prediction that entry can lead commission rates to *increase*. . . .”) (emphasis in original); Hitt 2021-03-15 Rebuttal Report in *Epic v. Apple* ¶421 (an “increase in commission rates” following rival entry “defies economic logic”).

<sup>487</sup> The “workhorse” competition model for differentiated markets (like the iOS app distribution market would be in the but-for world) is the differentiated Bertrand model, which assumes that firms compete on price and do not tacitly coordinate on price. See ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 273 (2d ed. 2014) (“Typically, the merger simulation begins with the selection of one of four models of competition. [1] When firms produce largely homogenous products, the Cournot model of competition is often used. . . [2] The workhorse

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words, an incumbent’s price remaining at the 100% monopoly level after rival entry is the exception, rather than the rule.

317. The most common (but still rare) situation in which rival entry does not reduce an incumbent’s profit-maximizing price is when the incumbent and the rival(s) perfectly price coordinate at the 100% monopoly level.<sup>488</sup> Put simply, “perfect price coordination” would exist if all the new firms entered at the exact same price as the incumbent charged before it faced any competition (i.e., the 100% monopoly price) instead of undercutting the incumbent’s price. As applied here, this means that the additional competition from rival iOS app distributors in the but-for world would not have necessarily reduce Apple’s profit-maximizing commission if Apple and all the but-for entrants into the iOS app distribution market would have perfectly coordinated their prices at the 100% monopoly level.

318. The following sections discuss two types of evidence showing that, in the but-for world, competitors in the iOS app distribution market would have been unlikely to perfectly coordinate at the 100% level:

1. The characteristics of the iOS app distribution market in the but-for world (such as the product differentiation, number of competitors, and level of price transparency) make perfect price coordination unlikely; and
2. Competitors do not perfectly price coordinate at the 100% monopoly level in most similar markets untainted by anticompetitive conduct, such as the Windows and macOS app distribution markets.

319. The conclusion that additional competition from rival iOS app distributors would reduce the App Store’s profit-maximizing commission is also consistent with an email written by Phil Schiller, Apple’s lead executive in charge of the App Store, in 2011.<sup>489</sup> In that email, he wrote:

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model for differentiated product markets is Bertrand competition, which assumes that firms compete by setting prices. ... [3] in industries where a consumer seeks bids from its suppliers and selects the lowest bid, an auction model of competitive bidding may be appropriate. Alternatively, a bargaining model may be appropriate, if, for example a single consumer has a great deal of monopsony power over the merging firms.”). In a differentiated Bertrand model, every firm’s profit-maximizing price decreases as the number of firms in the market increase, holding all else equal. *See, e.g.* TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 282-283 (1988) (summarizing Salop’s model showing that the profit-maximizing price decreases as a function of the number of firms  $n$  using a model of product differentiation and competition on price).

<sup>488</sup> *See, e.g.*, TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 240-241 (1988) (discussing “Chamberlinian” tacit collusion, one of the first economic models of perfect price coordination).

<sup>489</sup> APL-EG\_00138494.

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“Do we think our 70/30 split will last forever? While I am a staunch supporter of the 70/30 split and keeping it simple and consistent across our stores, I don’t think that 70/30 will last that unchanged forever. I think someday we will see enough challenge from another platform or web based solutions to want to adjust our model.”<sup>490</sup>

Thus, Apple’s own executives have acknowledged the economic reality that increased competition from other iOS app distribution platforms would force Apple to adjust its commissions.

*1. The Characteristics of the iOS App Distribution Market Would Have Made Perfect Price Coordination Unlikely in the But-For World*

**320. Economic Fundamentals of Price Coordination.** With “uncoordinated” price competition, each firm sets the price that maximizes its short-run profits, which generally results in firms undercutting each other’s prices until they reach an “equilibrium” point where neither firm can increase its profits by cutting price further. In contrast, “coordinated” pricing occurs in a market when each competitor foregoes price cuts that would increase its profits in the short run in the hope that its rival(s) will keep their prices elevated later. “Perfect” price coordination refers specifically to when all firms coordinate at the 100% monopoly level, whereas “imperfect” price coordination involves coordinating at prices below the 100% monopoly level.

321. Given a fixed number of competitors in a market, the combined profits of all the competitors is higher when the firms coordinate their prices. Consequently, all firms would prefer to be in markets with price coordination, just as all firms would prefer to be 100% monopolists. Although all firms would prefer to price coordinate, not all markets are conducive to price coordination (let alone perfect price coordination) because market characteristics often make it difficult or impossible to successfully coordinate on price.

322. Economists have extensively studied which market characteristics hinder the ability of firms to coordinate on price, and have identified the following as the three largest obstacles to price coordination:

- a. Product differentiation and other sources of variation in the firms’ profit-maximizing prices (typically due to asymmetries between the firms)
- b. Nontransparent prices
- c. A significant number of competitors in the market

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<sup>490</sup> *Id.*

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323. All three of these obstacles to price coordination would exist in the iOS app distribution market in the but-for world, which makes it unlikely that Apple and its rival iOS app distributors would be able to perfectly price coordinate at the 100% monopoly price in the but-for world.

324. **a. In the But For World, Profit-Maximizing Commissions Would Vary Significantly Between Different iOS App Distributors Due to Firm Asymmetries, Making It Unlikely That All Firms Would Have Decided to Charge the 100% Monopoly Price.** Perfect price coordination requires not only that firms coordinate their prices, but that they all coordinate specifically on the price a 100% monopolist would charge in the market. The economic literature thus acknowledges that asymmetries between firms that cause their profit-maximizing prices to diverge makes price coordination (and perfect price coordination in particular) more difficult.<sup>491</sup>

325. Here, it is unlikely that all the rival iOS app distributors in the but-for world would decide to charge the same commission as Apple charges in the actual world because there would be significant variation in the different firms’ individually profit-maximizing commissions. Apple and its rival iOS app distributors would have varying profit-maximizing commissions in the but-for world because: (i) their products would be vertically differentiated; and (ii) they would likely have different business strategies.

326. *i. Vertical Product Differentiation in iOS App Distribution Market in the But-For World Would Have Caused Profit-Maximizing Commissions to Vary Across Firms.* Products in a market are “vertically” differentiated when customers on average view some products as higher quality than other products. Higher-quality products will have higher profit-maximizing prices than the lower-quality products, so profit-maximizing prices will vary between products in vertically differentiated markets. The economic literature is clear that product differentiation makes coordination more difficult because it is hard to coordinate on a common coordinated price for different products.<sup>492</sup> Indeed, because product differentiation makes price

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<sup>491</sup> TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 242 (1988) (“Under symmetric conditions, the price to coordinate on seems to be naturally the monopoly price. This price maximizes profit and involves a symmetric repartition of profits. Under asymmetric costs, there is no ‘focal’ price on which to coordinate.”).

<sup>492</sup> LOUIS KAPLOW, COMPETITION POLICY AND PRICE FIXING 269 (2013) (“[W]hen products are differentiated, there is no single price (and no single marginal cost), but rather one for each



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coordination difficult, the “workhorse” model for differentiated markets is Bertrand competition, which assumes no price coordination.<sup>493</sup>

327. Here, there are at least three ways in which one would expect iOS app distributors to be vertically differentiated in the but-for world. *First*, because app distribution platforms have significant indirect network effects (an app distribution platform is more useful to developers the more consumers are on the platform, and vice versa), iOS app distributors with larger developer and/or consumer networks would be more valuable to users and developers than smaller iOS app distributors. *Second*, Apple admits that some app distributors vary in their ability to identify malicious apps.<sup>494</sup> *Third*, different iOS app distributors would likely have varying levels of cross-platform transferability of app purchases. For example, Steam and the Epic game store both currently allow users who purchase a game from them on Windows to play that same game on macOS without having to purchase the game again.<sup>495</sup> In contrast, if a user purchases an app on iOS through Apple’s iOS App

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product. In these instances, however, oligopolistic coordination is more difficult and hence less likely”); NICHOLSON & SNYDER INTERMEDIATE MICROECONOMICS AND ITS APPLICATION 429 (11<sup>th</sup> ed., Cengage Learning: 2009) (“Tacit collusion is easier if prices are transparent and goods are relatively standardized, for then it is easier for firms to have a common understanding about which prices are acceptable and which are so unacceptably low that should be punished with a price war.”); TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 240 (1988) (“starting with Chamberlin [a work published in 1929], several authors felt that repeated interaction between oligopolists should facilitate collusion. They also identified some factors that may hinder it. . . . As Chamberlin recognized, there are factors that may hinder collusion. We distinguish two such factors: detection lags and asymmetries between firms.”); *id.* at 242 (“Under symmetric conditions, the price to coordinate on seems to be naturally the monopoly price. This price maximizes profit and involves a symmetric repartition of profits. Under asymmetric costs, there is no ‘focal’ price on which to coordinate.”); DOJ/FTC HORIZONTAL MERGER GUIDELINES §7.2 (“A market is typically more vulnerable to coordinated conduct if . . . products in the relevant market are relatively homogeneous.”).

<sup>493</sup> ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 273 (2d ed. 2014) (“The workhorse model for differentiated product markets is Bertrand competition.”).

<sup>494</sup> Apple specifically argues that it provides better app review than Google does, for example. *See, e.g.*, Apple’s Proposed Findings of Fact and Conclusions of Law in *Epic v. Apple* ¶ 141 (“As a result of the App Review efforts and Apple’s subsequent processes, there is a significantly smaller number of malicious iOS apps than those available on Android. . . . Among app stores, Android app stores have significantly higher numbers of malicious apps than the App Store.”).

<sup>495</sup> *Switched Windows to Mac, do I have to buy Steam games again to play on Mac?* (available at <https://gaming.stackexchange.com/questions/254287/switched-windows-to-mac-do-i-have-to-buy-steam-games-again-to-play-on-mac>) (“Once you buy a steam game, you can use it on any computer, provided that the computer can run it. There should be no need to re-buy the mac

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Store, that user must re-purchase that app again from a different app distributor in order to use that app on a different operating system.

328. *ii. Profit-Maximizing Commissions Would Likely Vary Between iOS App Distributors in the But-For World Also Because Their Business Strategies Would Vary.* App distributors’ profit-maximizing commissions can vary also because of variation in the strategies that app distributors use to attract consumers and developers to their platforms. In other app distribution markets where multiple app distributors compete (such as the Windows and macOS app distribution markets), there is often significant variation in how app distributors entice consumers and/or developers to join their platform. For example, Epic entices consumers to join its platform in part by offering games to consumers for free (i.e., essentially subsidizing the cost of the games to consumers),<sup>496</sup> and entices developers to join its platform by offering lower commissions than most other app distributors.<sup>497</sup> In the but-for world, Epic would be able to compete in the iOS app distribution market too, and its significantly lower commissions would make it nearly impossible for other iOS app distributors to successfully coordinate their prices at the 100% monopoly level.

329. **b. Nontransparent Commissions Would Further Hinder Price Coordination.** The economic literature is also clear that it is harder to coordinate on prices when firms cannot easily observe each other’s prices.<sup>498</sup> First, it is harder

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versions of the same games, though you will need to download the mac versions of the game to your new computer. However, not all games for Windows work on Mac or Linux.”).

<sup>496</sup> <https://www.epicgames.com/store/en-US/free-games> (“Epic Games Store gives you a free game every week”); Christopher Grant, *Epic Games Store will offer ‘a free game very two weeks’ – how does that stack up?* (published December 7, 2018, available at <https://www.polygon.com/2018/12/7/18130542/epic-games-store-free-games>) (“Epic is looking to accelerate the growth of players’ collections by offering a free game every two weeks . . . Epic is hoping to use its massive Fortnite-fueled install base and some developer friendly terms to propel its platform into the rarified space currently dominated, though not exclusively, by Valve’s Steam platform.”).

<sup>497</sup> Nick Statt & Sean Hollister, *Epic Games takes on Steam with its own fairer game store* (published December 4, 2018, available at <https://www.theverge.com/2018/12/4/18124203/epic-games-fortnite-valve-steam-game-store-distribution-unreal-engine>) (Epic Game Store will charge 12% commission, as compared to Steam’s 20-30% commission).

<sup>498</sup> DOJ/FTC HORIZONTAL MERGER GUIDELINES § 7.2 (2010) (“A market typically is more vulnerable to coordinated conduct if each competitively important firm’s significant competitive initiatives can be promptly and confidently identified by that firm’s rivals. This is more likely to be the case if the terms offered to customers are relatively transparent. Price transparency can be



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to determine whether the other firms are following a coordination strategy when they cannot easily observe the other firm’s prices. Second, when prices are not transparent each firm has a stronger incentive to “cheat” by charging less than the coordinated price because it knows that other firms will have a difficult time detecting and punishing it for cheating on the coordinated price.

330. In the but-for world, rival iOS app distributors would have difficulty detecting changes in each other’s commissions because app distributors typically do not publicize their full commission structures. For example, Apple did not publicize the existence of its Video Partner Program until September 24, 2020, even though it began entering into “precursor” Video Partner Program agreements as early as March 2015.<sup>499</sup> Similarly, Google does not publicize [REDACTED]

[REDACTED]<sup>500</sup> Because iOS app distributors would not be able to immediately detect when other iOS app distributors privately reduced their commission structures, each iOS app distributor would have a strong incentive to privately reduce their commission structure to steal market share from its competitors. That private commission-cutting would cause any attempt at perfect price coordination to quickly unravel.

**331. c. In the But-For World, a Significant Number of Competitors in the iOS App Distribution Market Would Likely Prevent Perfect Price Coordination, Even If None of the Other Obstacles to Perfect Price Coordination Existed.** Theoretically, firms are less likely tacitly coordinate their prices the more firms compete in the market, for three primary reasons. First, the greater the number of firms in the market, the less each firm’s price affects the pricing decisions of other firms. Consequently, when many firms compete in a market, each firm will set its price assuming that its own will have little-to-no effect on the prices of its rivals, which matches the mathematical assumption of Bertrand

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great for relatively homogeneous goods.”); NICHOLSON & SNYDER INTERMEDIATE MICROECONOMICS AND ITS APPLICATION at 429 (11<sup>th</sup> ed., Cengage Learning: 2009) (“Tacit collusion is easier if prices are transparent.”); ABA SECTION OF ANTITRUST LAW, ECONOMETRICS 286 (2d ed. 2014) (one of the “three general characteristics of competitive environments that facilitate collusion” is “prices must be *transparent*, so that firms may monitor each other’s behavior”).

<sup>499</sup> The earliest VPP precursor agreement I have found is the March 5, 2015 agreement between Apple and HBO. APL-APPSTORE\_10419027. See Stephen Warwick, *Apple explains controversial Video Partner Program in new guidance* (published September 24, 2020, available at [www.imore.com/apple-explains-controversial-video-partner-program-new-guidance](http://www.imore.com/apple-explains-controversial-video-partner-program-new-guidance)).

<sup>500</sup> GOOG-APPL-00126037 at GOOG-APPL-00126046-47 (August 2020 internal Google presentation [REDACTED])

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(uncoordinated) competition.<sup>501</sup> Second, the greater the number of firms in the market, the higher the probability that at least one firm acts as a “maverick” by undercutting any coordinated price in order to earn a larger share of the market and greater profits in the short run.<sup>502</sup> Third, the greater the number of firms in the market, the greater the probability that some of the firms’ profit-maximizing prices differ between each other, which makes it less likely that the firms can jointly coordinate on a single price.<sup>503</sup>

332. The empirical literature indicates that entry by just one or two firms can suffice to prevent perfect price coordination at the 100% monopoly level, and that *any* price coordination becomes unlikely once there are five or more firms in the market.<sup>504</sup> The Merger Guidelines similarly conclude that markets are “unlikely to be vulnerable to coordinated conduct” (i.e., *any* price coordination) when they have HHIs below 1,500, which would occur, for example, if the market had seven equally-sized competitors.<sup>505</sup>

333. Here, the evidence detailed above indicates that there would likely be at least five significant competitors in the iOS app distribution market in the but-for world, given the market’s high profit margins, low barriers to entry in the but-for world, the large number of firms that would have been well-positioned to enter the market, and the observed high number of app distributors and self-distributors in Windows app distribution market, which is untainted by the challenged conduct. With that many competitors, both theoretical and the empirical economic literature indicate that even *imperfect* price coordination would be difficult. That makes it particularly unlikely that the various iOS app distributors in the but-for world would be able to *perfectly* coordinate their prices at the 100% monopoly price.

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<sup>501</sup> SCHERER & ROSS, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 277-278 (3d ed. 1990).

<sup>502</sup> *Id.*

<sup>503</sup> *Id.*

<sup>504</sup> Bresnahan & Reiss, *Entry and Competition in Concentrated Markets*, 99 J. POL. ECON. 977 (1991) (“Our empirical results suggest that competitive conduct changes quickly as the number of incumbents increases. In markets with five or fewer incumbents, almost all variation in competitive conduct occurs with the entry of the second or third firm. Surprisingly, once the market has between three and five firms, the next entrant has little effect on competitive conduct.”).

<sup>505</sup> DOJ/FTC HORIZONTAL MERGER GUIDELINES §7.1 (“unconcentrated markets [i.e., those with an HHI below 1,500] are unlikely to be vulnerable to coordinated conduct”).



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*2. Competitors Do Not Perfectly Price Coordinate at the 100% Monopoly Level in the Most Similar Markets in Which App Distribution Is Relatively Unrestrained*

334. The two markets that are most similar to the iOS app distribution market, but are relatively unrestrained by anticompetitive conduct, are the Windows and macOS app distribution markets. (The Android app distribution market is restrained by a different set of restraints on app distribution, as is detailed below in Appendix A.) The Windows and macOS app distribution markets therefore can provide clues about the extent of price coordination one would expect in the iOS app distribution market but for Apple’s anticompetitive conduct.

335. Firms clearly are *not* perfectly coordinating at the 100% monopoly level in either the macOS or the Windows app distribution markets. For example, the Epic Games Store (which competes in both the macOS and Windows OS app distribution markets) has a default commission of 12%,<sup>506</sup> which is not only much lower than Apple’s 30% default commission in the macOS app distribution market, but also lower than Apple’s minimum 15% commission in the macOS app distribution market.<sup>507</sup> The Epic Game Store’s 12% default commission is also lower than the 20% minimum commission charged by the leading Windows app distributor, Steam.<sup>508</sup>

336. Rival app distributors in the Windows and macOS app distribution markets vary not only in their minimum commission percentages, but also in how they price discriminate between apps and/or developers. For example, Apple recently began charging smaller developers lower commissions than larger developers,<sup>509</sup> whereas Valve (which competes in both the Windows and macOS app

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<sup>506</sup> Epic Games Store, FAQ page (available at <https://www.epicgames.com/store/en-US/about>) (“Is this 88% revenue share a special introductory rate? There is no catch; the 88% share to the developer is the permanent rate. Epic’s 12% share covers the operating costs of the store and makes us a profit.”).

<sup>507</sup> <https://developer.apple.com/app-store/subscriptions/> (Apple’s minimum 15% commission for subscriptions that have lasted over a year applies to both iOS and macOS).

<sup>508</sup> Steam Team, *New Revenue Share Tiers and other updates to the Steam Distribution Agreement* (published November 30, 2018, available at [steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838](http://steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838)).

<sup>509</sup> Apple Newsroom, Apple announces App Store Small Business Program (published November 18, 2020, available at [www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/](http://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/)) (“New program reduces App Store commission to 15 percent for small businesses earning up to \$1 million per year. . . The App Store Small Business Program . . . will launch on January 1, 2021”).

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distribution markets with its Steam platform) charges smaller developers *higher* commissions than larger developers.<sup>510</sup>

***C. Apple’s Actual App Store Commissions Exceed Other Experts’ Estimates of But-For Competitive Commission Rates***

337. My conclusion that the App Store’s average profit-maximizing commission would have been lower but for Apple’s anticompetitive conduct is consistent with the testimony of other experts who have estimated the but-for average commission percentage in the iOS app distribution market.

338. In the actual world, Apple’s average commission percentage charged to class members from the start of the class period (June 4, 2015) to the end of the current transaction data (Sept. 30, 2019) was 27.3%.<sup>511</sup> (This figure differs from Apple’s 28.4% average commission to all developers because the figure here is limited to commissions charged to those developers who are class members.) This 27.3% average commission to class members reflects Apple charging its default 30% commission for [REDACTED] of the relevant revenue, and its lower 15% commission (for year-old subscriptions and/or the Video Partner Program) for [REDACTED] of the relevant revenue.<sup>512</sup>

339. Prof. Economides’s analysis indicates that the weighted average effective commission in the Windows app distribution market, which is not tainted by the challenged conduct, was only [REDACTED].<sup>513</sup> Prof. Economides also presents an economic model that estimates that the average commission rate in the iOS app

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<sup>510</sup> Steam Team, New Revenue Share Tiers and other updates to the Steam Distribution Agreement (published November 30, 2018, available at [steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838](https://steamcommunity.com/groups/steamworks/announcements/detail/1697191267930157838)) (“Starting from October 1, 2018, . . . when a game makes over \$10 million on Steam, the revenue share for that application will adjust to 75%/25% on earnings beyond \$10M. At \$50 million, the revenue share will adjust to 80%/20% on earnings beyond \$50M. Our hope is this change will reward the positive network effects generated by developers of big games, further aligning their interests with Steam and the community.”).

<sup>511</sup> “ELOC712 avg comm\_pct for class members during class period.txt”.

<sup>512</sup> “ELOC712 pct of app store revenue by comm tier during class period.csv”. Likewise, [REDACTED] of transactions used the 30% commission tier instead of the lower 15% commission tier. *Id.* From the start of the class period to the end of Apple’s currently-produced transaction data (September 2019) there were [REDACTED] transactions where class members paid Apple a commission. *Id.*

<sup>513</sup> Economides Opening Class Report Table 4.

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distribution market in the but-for world would have been 13.0-14.8%.<sup>514</sup> Prof. Evans, who was retained by Epic Games in its related litigation against Apple, estimated that the App Store’s average commission rate in the but-for world would have been 14.9%.<sup>515</sup> Thus far, Apple’s retained economic experts have critiqued Prof. Evans’ estimate of the App Store’s average but-for commission, but have not put forth any estimates of Apple’s but-for commission that they believe are reliable.<sup>516</sup> Thus, Apple’s actual average commission to class members of 27.3% far exceeds the estimates of but-for average commissions made by all other experts who have offered such an estimate. Their estimates are thus consistent with my conclusion from other sections that the but-for Apple commission would have been lower to at least some extent.

## V. ALL CLASS MEMBERS PAID AN ANTICOMPETITIVELY INFLATED COMMISSION

340. Evidence common to the class shows that all class members paid an anticompetitively inflated commissions to Apple during the class period. Part IV above showed that Apple’s average profit-maximizing commission would have been lower in the but-for world due to increased competition from rival iOS app distributors. This Part establishes that:

- A. There are approximately 60,000 class members.
- B. In the but-for world, Apple would face more intense competition for *all* developers, so one would accordingly expect Apple to respond by reducing commission for *all* developers.
- C. In the but-for world, Apple would most likely adjust its entire commission structure downward, which would necessarily reduce all class members’ commissions.

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<sup>514</sup> Economides Opening Class Report Table 6.

<sup>515</sup> Evans 2021-02-16 Expert Report in Epic v. Apple ¶734 (“I showed earlier that with more competition, the commission would be 14.9 percent, under plausible assumptions, compared to the 26.4 percent effective rate under monopoly conditions.”); *id.* ¶¶591-597 (describing underlying premises and methodology for his 14.9 percent but-for commission estimate). Prof. Evans calculation of a 26.4% effective Apple commission rate varies from my calculations of Apple’s average commission rate because, while I relied on the actual transactional data, Prof. Evans relied on summary financial *forecasts*. See Evans 2021-02-16 report ¶458, n. 662.

<sup>516</sup> Prof. Lafontaine has the most extensive critique of Prof. Evans’ but-for commission estimate. See 2021-03-15 Rebuttal Report in Epic v. Apple ¶246. Prof. Hitt endorses Prof. Lafontaine’s critique, but does not appear to add to it. See Hitt 2021-03-15 Rebuttal Report in Epic v. Apple, ¶421.

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D. Apple’s commission was anticompetitively inflated for both games and non-games.

*A. Identification of Class Members*

341. Plaintiffs define the developer class as: “All U.S. developers of any Apple iOS application or in-app product (including subscriptions) sold for a non-zero price via Apple’s iOS App Store at any time on or after June 4, 2015.”<sup>517</sup>

342. I therefore consider an iOS developer to be a member of the class if all the following conditions are true:

- a. The developer resides in the United States.<sup>518</sup>
- b. The developer is not Defendant Apple or an opt-out Plaintiff.<sup>519</sup>
- c. The developer paid a commission to Apple at least once since the beginning of the class period (June 4, 2015).<sup>520</sup>

343. There are [REDACTED] developers total in Apple’s currently produced transaction data, but only 59,420 are class members.<sup>521</sup> Developers who are not class members typically: (a) do not reside in the United States; and/or (b) never paid Apple a commission during the class period because they only published free apps.<sup>522</sup>

344. Most class members paid a relatively small amount of total commissions during the class period. The median total amount of commissions paid

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<sup>517</sup> I understand that Plaintiffs have moved to certify a class with this definition.

<sup>518</sup> I identify a developer as residing in the United States if its country code equals “USA” or “PRI” (Puerto Rico) in Apple’s “content-provider” lookup table.

<sup>519</sup> I understand that no plaintiffs have opted out of the class. If some plaintiffs opt out in the future, I will adjust my programs accordingly to exclude them from the class.

<sup>520</sup> I do not consider a developer to have paid a commission on a transaction if the data indicates that the commission percentage was not 15% or 30% because those rare observations appear to be data errors. *See infra* section C.3a. I also do not consider a developer to have paid a commission on a transaction if the data indicates that the developer “waived” the royalty. *Id.*

<sup>521</sup> “ELOC704 class member counts.csv”. The “content\_provider\_id” variable in Apple’s transaction data uniquely identifies each developer. *See* June 25, 2020 email from Apple Counsel E. Lazarus to Developer Plaintiff Counsel B. Siegel, titled “RE: 2020-04-15 Eli Lazarus - Benjamin Siegel Re Apple Data Discovery(1256998.1).pdf” (describing the “CONTENT\_PROVIDER\_ID” data field as indicating the “Unique ID for the content provider.”)

<sup>522</sup> “ELOC704 reasons devs are not classmembers.csv”. [REDACTED] of non-class members never paid a commission during the class period and did not reside in the United States. [REDACTED] of non-class members resided in the United States but never paid a commission during the class period. [REDACTED] of non-class members paid a commission during the class period but resided outside the United States.



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during the class period among class members was only [REDACTED].<sup>523</sup> [REDACTED] of class members paid less than \$1,000 in commissions, [REDACTED] paid less than \$50,000 in commissions, and [REDACTED] paid less than \$100,000 in commissions.<sup>524</sup>

345. Because Apple’s produced transaction data stops at the end of September 2019, there are some class members who do not appear in the currently produced data: domestic developers who first paid a commission to Apple after September 2019. When Apple produces more recent transaction data, I will update these statistics accordingly.

***B. Apple Would Face More Competition for All Developers in the But-For World, So One Would Expect Apple to Reduce All Developers’ Commissions***

346. In the but-for world, Apple would face increased competition for *every* developer. *Every* developer would have the option of self-distributing their apps, and *every* developer would have the option of using a rival iOS app distributor, either as an alternative or a supplement to distributing through Apple’s App Store. Put another way, in the but-for world there would be no subset of class members who would *not* have an alternative to the iOS app store for distributing native iOS apps. Because Apple would face increased competition for every developer in the but-for world, it would be most logical for Apple’s price response to apply to every developer.

347. Because app distributors are two-sided platforms, they can theoretically respond to increased competition by not only reducing commissions to developers, but also subsidizing app prices for consumers (and thus effectively charging a negative price to consumers).<sup>525</sup> However, in the actual world, Apple has always charged consumers a zero price for using its App Store platform; it has neither charged consumers a positive price (e.g., charging consumers per transaction or a sign-up cost for using the store) nor charged consumers a negative price (subsidizing

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<sup>523</sup> “ELOC704 median class member commission.txt”.

<sup>524</sup> "ELOC704 pct of class members with less than 1k in commissions during class period.csv"; "ELOC704 pct of class members with less than 50k in commissions during class period.csv"; "ELOC704 pct of class members with less than 100k in commissions during class period.csv".

<sup>525</sup> For example, Epic has attracted consumers to its Epic Games Store in part by providing them with free games each week.

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app prices).<sup>526</sup> Further, whenever Apple has adjusted its prices in its two-sided App Store platform, it has always adjusted the developer commission, not the consumer price.<sup>527</sup> This indicates that Apple has concluded that the optimal business strategy for responding to changes in the profit-maximizing prices of its App Store platform is by adjusting the developer commission instead of the consumer price, and there is no reason to think that would not have also been its optimal business strategy in the but-for world.

***C. Apple Would Have Most Likely Adjusted Its Entire Commission Structure Downward in the But-For World***

348. Evidence and economic theory indicate that the most likely way for Apple to reduce its average commission in the but-for world would be to adjust its entire commission structure downward. This would result in Apple still having just two commission tiers: (1) a higher “default” commission; and (2) a lower commission that applies to transactions that satisfy the conditions of the year-old subscription policy, the Video Partner Program, or the Small Business Program. However, both the higher “default” commission tier and the lower commission tier would be lower in the but-for world than they were in the actual world.

349. Apple adjusting its entire commission structure downward in the but-for world is a *sufficient* condition for the challenged conduct harming every class member. If Apple adjusted its entire commission structure downward in the but-for world, then Apple’s commission would necessarily be lower for every transaction in the but-for world than it was in the actual world. This would imply that the challenged conduct harmed every developer in the class on every transaction. If Apple’s commission structure would have been lower in the but-for world than it was in the actual world, then all class members are harmed, regardless of whether in the but-for world they would have: (1) purchased iOS app distribution and IAP distribution services from Apple, (2) purchased iOS app distribution from rival iOS app distributors; and/or (3) directly distributed iOS apps. This is because, if a developer would have chosen in the but-for world to distribute its iOS app through

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<sup>526</sup> Schmalensee 2021-02-16 report in *Epic v. Apple* ¶71 (“In order to encourage consumers’ use of the App Store, Apple does not charge consumers access or transaction fees on the App Store platform.”).

<sup>527</sup> Apple has made three adjustments to the prices on its App Store platform, all of which have been changes to the developer commission: (1) reducing the commission percentage to 15% for year-old subscriptions; (2) reducing the commission percentage to 15% for enrollees in the Video Partner Program; and (3) reducing the commission percentage to 15% for “small” developers who earn less than \$1 million in royalties per year.

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a means other than the App Store, then one can infer that the developer would have obtained even greater welfare from using the rival iOS app distributor than from using the App Store at the lower but-for Apple commission. Thus, the difference between the commission Apple charged a developer in the class in the actual world and the commission Apple would have charged that developer for the same transaction in the but-for world is the minimum amount of harm to that developer; the harm to the developer would be even greater if the developer would have obtained even more welfare by using a rival iOS app distributor rather than by using Apple's iOS app distribution services at its lower but-for price.<sup>528</sup>

350. However, Apple adjusting its entire commission structure downward is *not a necessary* condition for the challenged conduct harming all or nearly all class members. As discussed further below, [REDACTED] of class members appearing in the data that Apple has produced paid Apple's default 30% commission on at least once transaction.<sup>529</sup> Consequently, even if Apple would have reduced only its default 30% commission in the but-for world, then [REDACTED] of the class members that appear in Apple's currently produced data were still harmed.

351. The following sections describe the evidence and theory indicating that Apple would have adjusted its entire commission structure downward in the but-for world:

1. Apple would be unlikely to reduce its average commission by individually negotiating lower commissions because it refuses to negotiate developer commissions as a matter of policy.
2. Apple's data confirms Apple maintains a rigid pricing structure in the actual world, and thus that it would likely maintain such a price structure in the but-for world too.

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<sup>528</sup> Although the following is unnecessary to show harm to all class members, one would also expect rival iOS app distributors' commissions in the but-for world to be lower than Apple's commissions in the actual world. Apple's commissions in the actual world are the commissions of a near-100% monopolist, and economic theory indicates that Apple and its rival iOS app distributors would charge the 100% monopoly price in the but-for world only if they were perfectly price coordinating. As discussed in Part IV.B, the characteristics of the domestic iOS app distribution market in the but-for world would make such perfect price coordination unlikely. Without such perfect price coordination, economics predicts that both Apple and its rival iOS app distributors would price below the 100% monopoly price (i.e., Apple's actual world commission) in the but-for world.

<sup>529</sup> See *infra* note 560.

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3. Apple would most likely continue to use only two commission tiers in the but-for world, given that it repeatedly decided not to create additional commission tiers in the actual world.
4. Apple would most likely reduce both of its commission tiers in the but-for world in order to respond to increased competition for all developers while simultaneously maintaining the incentives for developers to retain subscribers and enroll in the Video Partner Program.

1. *Apple Refuses to Individually Negotiate Developer Commissions*

352. Apple would be unlikely to reduce its average commission by individually negotiating lower commissions because Apple refuses to negotiate developer commission as a matter of policy.

353. Apple executives have acknowledged that Apple does not individually negotiate commissions with developers. For example, Carson Oliver, Apple’s Director of Business Management for the App Store, testified that he was not aware of any situations in which “apps or individual developers . . . have negotiated for a deviation from a 30 percent [commission] for digital goods or services.”<sup>530</sup> Similarly, Apple’s CEO, Tim Cook, testified to Congress that Apple did not grant “unique terms” to Amazon, and that Apple instead “ultimately developed a set of standard terms for Amazon, and every other video-streaming service that met the criteria, to launch their service on Apple TV and iOS.”<sup>531</sup> Apple’s Senior Vice President of Internet Software and Services, Eddy Cue, likewise testified that he is not “aware of any individually negotiated agreements in which an iOS app developer has been offered a commission that is less than 30 percent.”<sup>532</sup>

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<sup>530</sup> Carson Oliver (App Store’s Director of Business Management) Deposition, Vol.1, at 96:25-97:5 (“Q. To your knowledge, other than categorically are there individual apps or individual developers who at any point have negotiated for a deviation from a 30 percent for digital goods or services? A. No, not to my knowledge.”).

<sup>531</sup> PX 425 (Cook written testimony to Congress) at 8.

<sup>532</sup> Eddy Cue (Senior Vice President of Internet Software and Services) Deposition Vol. 1 at 239:17-239:22; *see also id.* at 231:20-231:22 (testifying that since the launch of the App Store, Apple has “strived to make it so that a small developer was paying the same thing, for example, as a large developer”); PX 425 at 8 (CEO Tim Cook testimony to Congress that “playing favorites” by granting special deals to particular developers “would be counter to our goal of attracting the highest-quality developers to the App Store”); Phil Schiller (Apple Fellow and 30(b)(6) Witness) Deposition Vol. 2 at 477:18-21 (testifying that “[t]here’s been a goal of mine since first starting the App Store that we create a set of guidelines and terms that apply to all developers who want to take part in them”).



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354. Similarly, one of Apple’s retained economic experts, Prof. Schmalensee, explicitly acknowledges that:

“Exceptions to the 30 percent commission for digital goods always apply to a class of apps or developers, i.e., apps or developers that fall under one of the specific categories outlined the App Store review guidelines; no individual app or developer has ever negotiated a special exception.”<sup>533</sup>

355. Prof. Schmalensee likewise acknowledges that “Apple . . . has not given [the largest developers] special deals.”<sup>534</sup>

## 2. *Apple Maintains a Rigid Pricing Structure*

356. Apple transaction data confirms that Apple maintains a rigid price structure for iOS developers, under which it applies the same pricing rules to all developers. This indicates that Apple finds a rigid price structure (rather than individual negotiation) profit-maximizing, and therefore that Apple would likely maintain a similarly rigid price structure in the but-for world too. The following sections present statistics describing the rigidity of Apple’s price structure for: (a) purchases of apps; (b) one-time IAPs; and (c) automatically recurring subscriptions.

### a. Purchases of Apps

357. Before Apple implemented its “Small Business Program” in January 2021, Apple’s default commission rate for all purchases of apps was 30%.<sup>535</sup> The transaction data Apple has produced thus far spans from July 2008 to the end of September 2019, and therefore predates the small business program. For all

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<sup>533</sup> Schmalensee 2021-02-16 Report n. 145 (citing Carson Oliver (App Store’s Director of Business Management) Deposition, Vol.1, at 96:25-97:5 (“Q. To your knowledge, other than categorically are there individual apps or individual developers who at any point have negotiated for a deviation from a 30 percent for digital goods or services? A. No, not to my knowledge.”)).

<sup>534</sup> Schmalensee 2021.03.15 Rebuttal Report ¶138.

<sup>535</sup> Starting in January 2021, Apple began charging a 15% commission for all of a developers’ transactions if the developer earned less than \$1 million per year. *See* Apple Newsroom, Apple announces App Store Small Business Program (published November 18, 2020, available at [www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/](https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/)) (“New program reduces App Store commission to 15 percent for small businesses earning up to \$1 million per year. . . . The App Store Small Business Program . . . will launch on January 1, 2021 . . . The App Store’s standard commission rate of 30 percent remains in place for apps selling digital goods and services and making more than \$1 million in proceeds, defined as a developer’s post-commission earnings.”).

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transactions during the class period that are covered by the produced transactional data, Apple always used its default 30% commission when consumers purchased apps.<sup>536</sup>

b. One-time IAPs

358. Before Apple implemented its “Small Business Program” in January 2021, Apple’s default commission rate for all one-time (as opposed to automatically recurring) in-app purchases was 30%.<sup>537</sup> The only situation in which a one-time IAP can qualify for the lower 15% commission is if it is a purchase of a video on demand (“VoD”) from a developer that has enrolled in Apple’s Video Partner Program.<sup>538</sup>

359. Apple’s transaction data shows that it used the default 30% commission of the time when consumers made one-time in-app purchases during the

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<sup>536</sup> See “ELOC711 app\_purch comm\_tier counts.csv”, calculated using Apple transaction data. This calculation was limited to transactions where all of the following are true: (1) the consumer purchases an app for a positive amount; (2) the transaction occurred after the beginning of the class period; (3) the Apple transaction data does *not* indicate that the developer royalty was “waived.”

<sup>537</sup> Schmalensee 2021-02-16 Report ¶51 (“Most recently, in November 2020, Apple reduced the commission rate on paid apps and in-app purchases to 15 percent for developers that have proceeds from the App Store of less than \$1 million USD a year for all apps combined.”). Apple Newsroom, Apple announces App Store Small Business Program (published November 18, 2020, available at [www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/](https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/)) (“The App Store Small Business Program, which will launch on January 1, 2021 . . . The App Store’s standard commission rate of 30 percent remains in place for apps selling digital goods and services and making more than \$1 million in proceeds, defined as a developer’s post-commission earnings.”).

<sup>538</sup> See *infra* note 543 (summarizing Apple admissions regarding the situations in which the 15% commission applies). See also APL-APPSTORE\_07096778 (May 27, 2017 email from Peter Stern at apple to Eddy Cue at Apple, stating: “As agreed upon late last year, we have created a standard form agreement for the Universal Services Program via an addendum to the DPLA. . . . We have already used versions of this with a couple of developers but seek to now codify a standard agreement so we can scale without negotiations. . . . This program is limited to apps that primarily provide premium long-form videos through a recurring subscription. Participants receive a reduced 15% commission rate on tvOS and iOS in app purchases, additional video package upgrades/downgrades, premium channels, and/or transactional **VoD rentals** so long as they: are available on tvOS and iOS with IAP; support Universal Search, TV App, Live/Sports Tune-In, and Single Sign-On on iOS and tvOS, as applicable; support all applicable Universal Services as of the Effective Date of the Addendum; . . . only offer additional content via IAP to users who signed up for the developers’ service through IAP.”) (emphasis added); see also APL-APPSTORE\_07096780 (attachment to this May 27, 2017 email with the draft contract).

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class period.<sup>539</sup> This shows that the video-on-demand exception to Apple’s default 30% commission for one-time IAPs applies less than [REDACTED] of the time.

c. Automatically Recurring Subscriptions

360. When Apple first introduced automatically recurring subscriptions in February 2011, Apple charged its default 30% commission for all automatically recurring subscriptions.<sup>540</sup> In March 2015, Apple started entering into “precursor” agreements to what would become its “Video Partner Program,” under which premium subscription providers could pay 15% commissions on all of their subscription transactions (even if they were not a year old yet) in exchange for integrating their video services with numerous Apple technologies, such as Apple TV, Siri, and AirPlay.<sup>541</sup> On June 13, 2016, Apple began charging a lower 15%

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<sup>539</sup> See “ELOC711 oiap comm\_tier counts.csv”, calculated using Apple transaction data. This calculation was limited to transactions where all of the following are true: (1) the consumer purchases an app for a positive amount; (2) the transaction occurred after the beginning of the class period; (3) the Apple transaction data does *not* indicate that the developer royalty was “waived.”

<sup>540</sup> Apple Newsroom, Apple Launches Subscriptions on the App Store (published February 15, 2011, available at <https://www.apple.com/newsroom/2011/02/15Apple-Launches-Subscriptions-on-the-App-Store/>) (“Apple today announced a new subscription service available to all publishers of content-based apps on the App Store. . . . Apple processes all payments, keeping the same 30 percent share that it does today for other In-App Purchases.”).

<sup>541</sup> Apple, “Apple Video Partner Program,” available at <https://developer.apple.com/programs/video-partner/>, accessed on February 8, 2021 (“Since 2016, the Apple Video Partner Program has enabled premium subscription video providers to participate in a new TV watching experience on the Apple TV app, helping customers discover the world’s best premium video content in one app, across all their devices... As a program member, you earn 85% of sales from customers who sign up using Apple’s in-app purchase system.”).

See also Matt Fischer Deposition Vol. 2 (January 7, 2021) at 406-408 (testifying that the Video Partner Program was in existence in 2015).

See also Apple’s Objections and Responses to Developer Plaintiff’s First Set of Interrogatories (2021-02-04) (“Apple has offered a reduced 15% commission to premium subscription video entertainment providers through the Video Partner Program and its precursor agreements”). The earliest VPP precursor agreement I have found is the March 5, 2015 agreement between Apple and HBO. APL-APPSTORE\_10419027.

See also. APL-APPSTORE\_07096778 (May 27, 2017 email from Peter Stern at apple to Eddy Cue at Apple, stating: “As agreed upon late last year, we have created a standard form agreement for the Universal Services Program via an addendum to the DPLA. . . . We have already used versions of this with a couple of developers but seek to now codify a standard agreement so we can scale without negotiations. . . . This program is limited to apps that primarily provide premium long-form videos through a recurring subscription. Participants receive a reduced 15% commission rate on tvOS and iOS in app purchases, additional video package

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commission for automatically recurring subscriptions whenever the subscription relationship between the consumer and the app’s “subscription group” had lasted at least one year.<sup>542</sup>

361. Ultimately, leaving aside the small business program that did not begin until January 2021, Apple has admitted that it charges its standard 30% commission for automatically recurring subscription transactions unless one of the two following exceptions applied:<sup>543</sup>

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upgrades/downgrades, premium channels, and/or transactional VoD rentals so long as they: are available on tvOS and iOS with IAP; support Universal Search, TV App, Live/Sports Tune-In, and Single Sign-On on iOS and tvOS, as applicable; support all applicable Universal Services as of the Effective Date of the Addendum; . . . only offer additional content via IAP to users who signed up for the developers’ service through IAP.”).

<sup>542</sup> Roger Fingas, *Apple announces it will offer App Store subscriptions to all apps, take smaller 15% cut.* (published June 8, 2016, available at <https://appleinsider.com/articles/16/06/08/apple-announces-it-will-offer-app-store-subscriptions-take-smaller-15-cut>) (stating, based on an interview with Apple executive Phil Schiller, that “Although the company’s current 30 percent revenue cut will remain in most cases, once a customer maintains a subscription for a year, that cut fall[s] to 15 percent. . . . The change will be effective as of June 13.”).

<sup>543</sup> Apple’s Objections and Responses to Developer Plaintiff’s First Set of Interrogatories (2021-02-04) (“Interrogatory No. 1: . . . “Other than the ‘commission on subscriptions drops to 15% after one year’ exception . . . , please describe every instance where [Apple] did not charge a U.S. iOS developer a 30% commission.” Answer, at pg. 9: “Apple also has several programs through which participating developers can qualify for reduced commissions. Apple has offered a reduced 15% commission to premium subscription video entertainment providers through the Video Partner Program and its precursor agreements. Additional information regarding Apple’s Video Partner Program is available at <https://developer.apple.com/programs/video-partner/>. Apple also recently launched the App Store Small Business Program, through which existing developers who made up to 1 million USD in proceeds in 2020 for all their apps, as well as developers new to the App Store, can qualify for a reduced commission rate of 15% on paid apps and in-app purchases. Additional information regarding Apple’s Small Business Program is available at <https://developer.apple.com/app-store/small-business-program/>.”) *See also*, Deposition of Eddy Cue (Apple) February 8, 2021 at 239 (“Q: . . . we’ve talked about the Apple subscription program, the video partner program, and the small business program. Are there any other programs offered by Apple that you’re aware of that offer developers a commission of anything other than 30 percent? . . . A: No.”); Deposition of Carson Oliver (Apple), Vol.1, January 26, 2021 (“Oliver Deposition, Vol.1”), at 96:18-23 (“So other than subscriptions, the small business program, the video partner program, or content that is not subject to commission under the Reader Rule or the Multi-Platform Rule, are there other deviations from the 30 percent for digital goods on an iPhone app? A. Not to my knowledge, no.”). The “Reader Rule” and “Multi-Platform” rule both allow developers to use their own transaction methods, in which case Apple does not collect any money from the consumer and there is thus no “commission” for it to retain. *See also* Schmalensee 2021-



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- a. The subscription was over a year old and the transaction occurred after June 13, 2016 (the “one-year-old subscription policy”), or
- b. The developer had enrolled in the Video Partner Program.

362. The transaction data Apple has produced thus far includes a variable named “proceeds\_reason” that indicates when a subscription has lasted more than one year.<sup>544</sup> After Apple adopted its year-old subscription policy on June 13, 2016, [REDACTED] of transactions involving year-old subscription used the 15% commission tier instead of the 30% commission tier.<sup>545</sup>

363. Among transactions during the class period that are covered by the produced transactional data and involved automatically recurring subscriptions that were *not* yet one year old, Apple has charged its default 30% commission [REDACTED] of the time and the lower 15% commission [REDACTED] of the time.<sup>546</sup> Apple’s 30(b)(6) deponent testified that the Video Partner Program is the only reason why Apple would charge the lower 15% commission for an automatically recurring subscription that was less than a year old.<sup>547</sup>

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02-16 Report ¶¶50-51 (acknowledging that these are the three reasons why Apple sometimes provides a lower 15% commission instead of its default 30% commission); Hitt 2021-02-16 Report ¶28 (same).

<sup>544</sup> The “proceeds\_reason” column in Apple’s transaction data indicates which transactions involved subscriptions that were at least a year old at the time of the transaction. The proceeds\_reason variable becomes relevant only after June 13, 2016, when Apple began providing the lower 15% commission for subscriptions that were a year old. *See infra* note 542. From June 13, 2016 onward, the “proceeds\_reason” column in Apple’s transaction data equals “Rate After One Year” only for transactions involving automatically recurring subscriptions that were at least a year old. *See* “ELOC703 proceeds\_reason match with est cdos.csv” (value of produced “proceeds reason” variable correctly indicates whether a subscription was a year old [REDACTED] of the time after June 13, 2016).

<sup>545</sup> “ELOC711 year-old sub, 15 vs 30.csv”. This statistic is limited to observations with 15% or 30% commission tiers, given the evidence described above that these are the only two commission percentages Apple uses in the actual world.

<sup>546</sup> “ELOC711 ltyo comm\_tiers.csv.”

<sup>547</sup> Mark Rollins (Apple 30(b)(6) on data issues) deposition at 338:1-342:19 (identifying VPP and SBA as only instances where there would be a 15% commission in Apple’s data and the “proceeds reason” (i.e., Subs 2.0) field would be blank; “Q: And so beyond those two, are there any other instances where in Apple’s transactional data, there would be a 15 percent commission, and the ‘proceeds reason’ field would be blank?” A: “To my knowledge, no”).

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*3. Apple Would Most Likely Continue to Use Only Two Commission Tiers in the But-For World*

364. The following sections establish that: (a) Apple has only two commission tiers in the actual world; and (b) Apple would be unlikely to create additional commission tiers in the but-for world.

a. Apple Has Only Two Commission Tiers in the Actual World: 30% and 15%

365. For any given transaction on the App Store, Apple charges developers a commission that equals the amount Apple charged the consumer (excluding taxes) minus the royalty Apple paid the developer.<sup>548</sup> The commission *percentage* for any given transaction therefore equals the commission divided by the amount Apple charged to the consumer. This commission percentage is mathematically undefined for any transaction where the amount Apple charged to the consumer is zero.<sup>549</sup>

366. Apple, its employees, and its retained experts have all acknowledged that Apple has only two commission percentage tiers: 30% and 15%. Apple’s default commission percentage is 30%.<sup>550</sup> There are only three exceptions to this default commission, which applied in limited circumstances and during certain time periods. Apple instead charged a 15% commission if: (1) starting in June 13, 2016, the transaction was for a subscription that was at least one-year old; (2) starting in March 2015, the developer was enrolled in Apple’s “Video Partner Program”; or (3)

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<sup>548</sup> There are only two exceptions to this rule. *First*, there is no commission when Apple is the developer. *Second*, there is no commission when the developer “waives” the royalty. Apple’s transaction data includes a variable named “rptg\_txn\_type” that indicates whether the developer “waived” the royalty. This variable indicates that the developer “waived” the royalty for [REDACTED] of app store transactions with non-zero amounts charged to the consumer. “ELOC772 comm\_tier counts during class period all defined.csv”. Apple has stated that: “A developer’s royalty is waived when the developer agrees to provide content for free which is normally paid. This is true, for example, with respect to certain promotions.” See May 5, 2021 letter from Apple Counsel (E. Dettmer) to Plaintiff Counsel (Byrd & Harrington). The [REDACTED] of transactions with non-zero amounts charged to the consumer and for which the developer royalty was “waived” according to the data thus appear to be data errors, and I accordingly do not consider the developer to have paid Apple a “commission” in those situations.

<sup>549</sup> Wolfram MathWorld, *Division by Zero* (available at <https://mathworld.wolfram.com/DivisionbyZero.html>) (“division by zero is undefined for real numbers”).

<sup>550</sup> 2021-02-04 Apple's Objections and Responses to Developer Plaintiffs' First Set of Interrogatories at 9 (“Apple charges developers a 30% commission on paid applications, specific in-app purchases, and initial-year subscriptions sold through the App Store, although the commission on subscriptions drops to 15% after one year”).

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starting in January 1, 2021, the developer was “small,” meaning that it earns less than \$1 million in royalties per year.<sup>551</sup> An Apple executive has testified that, besides these three listed exceptions, there are no situations where Apple charges a “commission of anything other than 30 percent.”<sup>552</sup> Similarly, Apple executives have repeatedly testified that it has not individually negotiated commissions, as described above.<sup>553</sup>

367. Since the beginning of the class period, in Apple’s transaction data the commission percentage is either 30% or 15% for the [REDACTED] of transactions where it is mathematically defined (i.e., where the amount Apple charged to the consumer was not zero).<sup>554</sup> The other [REDACTED] of transactions where the data indicates other commission percentages all appear to be data errors, for reasons discussed next.

368. The next most common commission percentage in Apple’s data is 100%, which occurs [REDACTED] of the time and reflects situations where Apple charged some amount to the consumer, Apple paid the developer no royalty, and Apple’s transaction data does not indicate that the royalty was “waived.”<sup>555</sup> These transactions most likely represent data errors, given that they are extremely rare and there is no other evidence that Apple actually charged a 100% commission.

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<sup>551</sup> Apple adopted the 15% commission for year-old subscriptions on June 13, 2016. *See* Roger Fingas, *Apple announces it will offer App Store subscriptions to all apps, take smaller 15% cut*, (published June 8, 2016, available at <https://appleinsider.com/articles/16/06/08/apple-announces-it-will-offer-app-store-subscriptions-take-smaller-15-cut>). Apple entered into the first “precursor” agreement to its Video Partner Program in March 2015. *See infra* note 541. Apple adopted the 15% commission for “small” developers on January 1, 2021. *See* Apple Newsroom, *Apple announces App Store Small Business Program* (published November 18, 2020, available at [www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/](http://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/)). *See also* 2021-02-04 Apple's Objections and Responses to Developer Plaintiffs' First Set of Interrogatories at 9 (same); Schmalensee 2021-02-16 report in *Epic v. Apple* ¶¶50-51; Deposition of Carson Oliver (Apple), Vol.1, January 26, 2021 (“Oliver Deposition, Vol.1”), at 96:18-23 (“So other than subscriptions, the small business program, the video partner program, or content that is not subject to commission under the Reader Rule or the Multi-Platform Rule, are there other deviations from the 30 percent for digital goods on an iPhone app? A. Not to my knowledge, no.”).

<sup>552</sup> Deposition of Eddy Cue (Apple) February 8, 2021 at 239 (“Q: . . . we’ve talked about the Apple subscription program, the video partner program, and the small business program. Are there any other programs offered by Apple that you’re aware of that offer developers a commission of anything other than 30 percent? . . . A: No.”).

<sup>553</sup> *Supra* Section C.1.

<sup>554</sup> “ELOC772 comm\_tier counts during class period all defined.csv.”

<sup>555</sup> *Id.*

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369. Transactions where the Apple’s transaction data indicates that the developer “waived” the royalty constitute [REDACTED] of transactions with non-zero amounts charged to the consumer.<sup>556</sup> These are also likely data errors, given that they are extremely rare and Apple has stated that developers “waive” the royalty when they provide normally paid content to consumers for free, in which case the amount charged to the consumer should equal zero.<sup>557</sup>

370. The transactions with commission percentages other than the ones described above also appear to be data errors. These transactions constitute only [REDACTED] of transactions with defined commission percentages,<sup>558</sup> slightly over half of these transactions absurdly indicate negative commission percentages,<sup>559</sup> and there is no evidence that Apple ever charged a commission tier besides 30% or 15%.

371. [REDACTED] of the [REDACTED] class members who appear in the currently produced data paid the default 30% commission at least once.<sup>560</sup> The only [REDACTED] class members that appear in the data who never paid the default 30% commission during the class period are: [REDACTED]  
[REDACTED]”<sup>561</sup>

b. Apple Would Be Unlikely to Create Additional Commission Tiers in the But-For World

372. Apple would be unlikely to create additional commission tiers in the but-for world given that it has repeatedly decided not to add additional commission tiers in the actual world.

373. Apple has created three programs under which a developer can pay less than the default commission: (1) the year-old subscription policy; (2) the Video Partner Program; and (3) the Small Business Program. Apple chose the exact same commission tier (15%) for all three programs instead of choosing a unique commission tier for each program. This indicates that Apple prefers to keep the pricing of its programs uniform.

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<sup>556</sup> *Id.*

<sup>557</sup> See May 5, 2021 letter from Apple Counsel (E. Dettmer) to Plaintiff Counsel (Byrd & Harrington) (“A developer’s royalty is waived when the developer agrees to provide content for free which is normally paid. This is true, for example, with respect to certain promotions.”).

<sup>558</sup> *Id.*

<sup>559</sup> “ELOC772 pct of odd comm tier transactions with positive comm\_pcts.csv”.

<sup>560</sup> “ELOC710 ever30 among classmembers.csv”.

<sup>561</sup> “ELOC710 never30 classmembers.csv”.



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374. Indeed, an internal Apple document shows that [REDACTED]

<sup>563</sup>

*3. Apple Would Most Likely Reduce Both Its High and Low Commission Tiers in the But-For World*

375. In the but-for world, Apple would most likely reduce both its high and low commission tiers (rather than just its high tier or just its low tier). As the following sections explain:

- a. Reducing both commission tiers would allow Apple to respond to increased competition for all developers in the but-for world.
- b. Reducing both commission tiers would allow Apple to maintain developer incentives to retain subscribers and integrate their apps into Apple TV.
- c. Commission tiers less than 15% (Apple’s current lowest commission tier) would be profitable for Apple and are already used by other app distributors.

a. Reducing Both Commission Tiers Would Allow Apple to Respond to Increased Competition for All Developers in the But-For World

376. As discussed above in section B, Apple would face increased competition for *every* developer in the but-for world. Consequently, one would expect Apple to respond to that increased competition by reducing its average commission in a way that reduces its commission for every developer. The most straightforward way to do this would be for Apple to reduce both its high commission tier and the low commission tier, which would necessarily reduce the commission it charged for each transaction.

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<sup>562</sup> APL-APPSTORE 10156938 at APL-APPSTORE 10156946 [REDACTED]

<sup>563</sup> *Id.*

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377. As an analogy, suppose that the only movie theater in town had two price tiers: a lower \$7 tier for seniors, and a higher \$10 tier for everyone else. Many movie theaters do in fact price discriminate this way because seniors typically have lower incomes. If rival movie theaters entered the town, then one would expect the incumbent movie theater to reduce both of its price tiers (e.g., to \$6 and \$8, respectively), given that both seniors and non-seniors would now have the alternative options of going to rival movie theaters. Similarly, here one would expect Apple to reduce both its high and low commission tiers in response increased competition in the iOS app distribution market, given that there would be more competition for all developers, regardless of the commission tier(s) that applied to them.

b. Reducing Both Commission Tiers Would Allow Apple to Maintain Developer Incentives to Retain Subscribers and Integrate with Apple TV

378. One would expect Apple to have reduced both its high commission tier and its low commission tier in the but-for world in part because reducing both tiers would help maintain incentives for developers to make investments that benefit Apple.

379. In the actual world, the difference between the high commission tier (30%) and the low commission tier (15%) incentivized developers to make the investments that can qualify some their transactions for the low commission tier, such as retaining subscriber for over a year and integrating their apps into Apple TV (a condition of the Video Partner Program). In fact, incentivizing such business conduct was Apple’s stated reason for providing the lower 15% commission for year-old subscriptions and developers who enrolled in the Video Partner Program.<sup>564</sup>

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<sup>564</sup> See Matt Fischer 1/7/2021 Dep. (Vol 2) at 408:15-20 (“I believe that our video team created our Video Partner Program and had the, you know, the 85/15 split as part of that program *in exchange for a bunch of different features and deliverables* that the developer would need to support specifically supporting the TV app.”) (emphasis added); Lauren Goode, *App Store 2.0* (published June 8<sup>th</sup>, 2016, available at <https://www.theverge.com/2016/6/8/11880730/apple-app-store-subscription-update-phil-schiller-interview>) (quoting Apple executive Phil Schiller as stating that Apple adopted the 15% commission for year-old subscriptions because “ ‘we recognize that developers do a lot of work to retain a customer over time in a subscription model, and we wanted to reward them for that by helping them to keep more of the revenue.’ Apple can help drive customers to the original download, Schiller argues, but only the developer can keep the customer over time and ‘we want to incent them to do that.’”); APL-APPSTORE\_07096778 (VPP program “Participants receive a reduced 15% commission rate .... so long as they: are available on tvOS and iOS with IAP; support Universal Search, TV App, Live/Sports Tune-In, and Single Sign-On

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For example, suppose that a developer expected to generate \$10,000 in revenue through its app. If the developer invested in integrating their app into Apple TV in order to qualify for the VPP, then the commissions would decrease from \$3,000 ( $30\% * \$10,000$ ) to \$1,500 ( $15\% * \$10,000$ ), thus saving the developer \$1,500 ( $\$3,000 - \$1,500$ ) in commissions. Consequently, one would expect this hypothetical developer to integrate their app into Apple TV if the cost of doing so was less than \$1,500.<sup>565</sup>

380. Importantly, the size of the incentive depends on the *difference* between the high commission tier and the low commission tier. For example, suppose that Apple’s high commission tier decreased to 20%, but its low commission tier stayed at 15%, so that the difference between the two tiers decreased from 15 percentage points to 5 percentage points. Then the developer in the hypothetical above would save only \$500 ( $\$10,000 * (20\% - 15\%)$ ) in commissions by integrating their app into Apple TV, and thus would have three times smaller an incentive to integrate into Apple TV.

381. Thus, reducing only the high (default) commission tier and not the lower commission tier would harm Apple by significantly reducing developers’ incentives to retain subscribers and integrate their apps into Apple TV. Instead, one would expect that in the but-for world Apple would have responded to competition by reducing *both* its high commission tier and its low commission tier in order to lower its average commission in a way that meets competition, while maintaining a commission structure that continues to provide similar incentives for developers to make investments that benefit Apple.

c. Apple’s Low Commission Tier Could Plausibly Be Less Than 15% in the But-For World

382. Apple’s commission for the low tier is 15% in the actual world, so reducing both commission tiers would necessarily require Apple to charge less than a 15% commission for some transactions. As described below, the evidence

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on iOS and tvOS, as applicable; support all applicable Universal Services as of the Effective Date of the Addendum”).

<sup>565</sup> In theory, one would expect the developer to also account for: (1) the time value of money (the investments in integrating the app into Apple TV occur now, but the commissions saved occur in the future); (2) opportunity costs (the developer can alternatively make other investments); and (3) the possibility that integrating their app into Apple TV may increase sales. This hypothetical omits those three considerations for simplicity.



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indicates that it would be profitable for Apple to charge less than a 15% commission for some transactions in the but-for world.

383. *Apple Would Profit on Each Marginal App Store Transaction So Long as The Commission Was At Least [REDACTED]* The App Store’s marginal costs were [REDACTED] of its *commissions* in 2019 and 2020.<sup>566</sup> The App Store’s average commission percentage during the class period was 28.4% of billings to the consumer.<sup>567</sup> Therefore, the App Store’s marginal costs as a percentage of billings to consumers were [REDACTED].<sup>568</sup> This means that Apple would profit off each additional transaction on the App Store so long as the commission was greater [REDACTED].

384. *Other app distributors already charge less than 15% commissions for some transactions.* Charging less than a 15% commission for some transactions is clearly plausible given that several other app distributors already do so:

- The Epic Games Store charges at *most* a 12% commission for any transaction.<sup>569</sup>
- In April 2021, Microsoft announced that it would reduce its commission for Windows games to 12% in August 2021.<sup>570</sup>
- Developers who use the Humble Bundle widget to sell games effectively pay a 10% commission (after accounting for payment processing fees).<sup>571</sup>
- [REDACTED]

[REDACTED]<sup>572</sup>

<sup>566</sup> See *supra* Part II.D.2.a.

<sup>567</sup> “ELOC810 avg commission during class period.txt”.

<sup>568</sup> 28.4% \* [REDACTED]

<sup>569</sup> Epic Games Store, About (<https://www.epicgames.com/store/en-US/about>).

<sup>570</sup> Matt Booty, *Continuing Our PC Gaming Journey in 2021 and Beyond* (published April 29, 2021, available at <https://news.xbox.com/en-us/2021/04/29/continuing-our-pc-gaming-journey-in-2021-and-beyond/>) (“starting on August 1 the developer share of Microsoft Store PC games sales net revenue will increase to 88%, from 70%.”).

<sup>571</sup> Humble Bundle, <https://support.humblebundle.com/hc/en-us/articles/202742190-Widget-Developer-FAQ> (“After deductions for payment processor fees (typically around 5%) the net revenue is split 95% to the developer, and 5% to Humble Bundle.” Thus, after accounting for payment processor fees, developers using the Humble Bundle widget typically receive 95% \* 95% = 90% of the amount charged to the consumer, excluding taxes).

<sup>572</sup> [REDACTED]

[REDACTED] Fortnite launched on the Galaxy



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- The Google Play Store’s [REDACTED] <sup>73</sup>
- Itch.io by default charges developers a 10% commission, but developers are free to select a higher or lower commission rate.<sup>574</sup>

***D. Apple’s Commission Was Inflated for Both Game Apps and Non-Game Apps***

385. All of the above analysis of anticompetitive impact applies equally to “game” apps and other genres of apps. Apple does not price discriminate based on genre; i.e., Apple’s commission structure does not depend in any way on an app’s genre. Consequently, anticompetitively inflating Apple’s high and low commission tiers harms all class members, regardless of whether they developed “game” apps or other genres of apps.

386. However, Apple’s economic experts have asserted that the impact of Apple’s challenged conduct may differ between games and non-games based on the premises that: (1) Apple purportedly charges a higher “effective commission rate” for game apps than for non-game apps; and (2) gaming apps face different “competitive conditions” than non-game apps because some transaction platforms and/or devices focus on games specifically.<sup>575</sup> In other words, Apple’s experts have argued that Apple’s challenged conduct might increase the commissions for game apps but not non-game apps, or vice versa.

387. To the contrary, the evidence affirmatively shows that Apple does *not* price discriminate between game apps and non-gaming apps; Apple uses the exact same commission structure for apps in the “games” genre as it does for apps in other genres. Thus, any purported differences in “competitive conditions” between game

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Store on August 9, 2018. <https://www.theverge.com/2018/8/9/17666316/samsung-galaxy-note-9-fortnite-android-release-unpacked-event-2018>.

<sup>573</sup> GOOG-APPL-00126037 at GOOG-APPL-00126047 [REDACTED]

<sup>574</sup> Itch.io, *Introducing open revenue sharing* (available at <https://itch.io/updates/introducing-open-revenue-sharing>).

<sup>575</sup> Hitt 2021-02-16 report in Epic v. Apple ¶57 (“game transactions face different competitive conditions from non-game apps”); *id.* ¶106 (“the set of transaction platforms and devices available for game apps differs from the set of transaction platforms and devices for all apps.”); Hitt Rebuttal Report Exhibit 30 (purporting to calculate the App Store’s average in-app purchase commission rate” by genre); *id.* Exhibit 31 (purporting to calculate the App Store’s “average initial download commission rate by genre”). Professor Lafontaine and Schmalensee refer to these arguments made by Prof. Hitt, but do not add to them. *See* Lafontaine 2021-03-15 Report ¶104; Schmalensee 2021-03-15 Report ¶119.

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and non-game apps that Apple’s experts identified clearly are not sufficiently large to induce Apple to price discriminate between game apps and non-game apps in the actual world. Further, the purported differences in “competitive conditions” between games and non-games that Apple’s experts identify in the actual world (which evidently did not cause Apple to price discriminate) would remain largely the same in the but-for world; in the but-for world, there would still be some app distributors that focus on games (like Steam), and there would still be some devices that focus on games (like the Nintendo Switch).

*1. Prof. Hitt’s Exhibits Purporting to Show Different “Effective Commission Rates” For Games and Non-Games Are Unreliable*

388. Prof. Hitt’s exhibits purporting to show that Apple charges different effective commissions for games and non-games are unreliable for two reasons.<sup>576</sup>

389. *First*, Prof. Hitt’s exhibits are mathematically incorrect because he sets the Apple commission rate equal to “0% for all transactions with no overall revenue.”<sup>577</sup> The commission rate for transactions with no overall revenue is actually mathematically undefined because the commission rate equals the commission amount divided by the revenue, and therefore equals zero divided by zero when there is no revenue, which is mathematically undefined.<sup>578</sup> Indeed, the software Prof. Hitt uses to calculate Apple’s “effective commission rate” by default correctly indicates that the commission rate is not zero when there is zero revenue, so Prof. Hitt has added programming code to override that (correct) default calculation with incorrect code that sets the commission rate equal to zero when there is zero revenue.<sup>579</sup> The transactions with no amount charged to the consumer are also irrelevant for determining harm to the developer class because the class is defined to include only developers who have sold apps or in-app products to consumers for non-zero amounts.<sup>580</sup>

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<sup>576</sup> Hitt Rebuttal Report Exhibit 30 (purporting to calculate the App Store’s average in-app purchase commission rate” by genre); *id.* Exhibit 31 (purporting to calculate the App Store’s “average initial download commission rate by genre”).

<sup>577</sup> Notes to Hitt Rebuttal Report Exhibit 30-31 (“Commission rate is set to 0% for all transactions with no overall revenue.”).

<sup>578</sup> Wolfram MathWorld, Division by Zero (available at <https://mathworld.wolfram.com/DivisionbyZero.html>) (“division by zero is undefined for real numbers”).

<sup>579</sup> See “ex\_30\_31.R” programming code from Prof. Hitt’s workpapers for his 2021-03-15 report in *Epic v. Apple*.

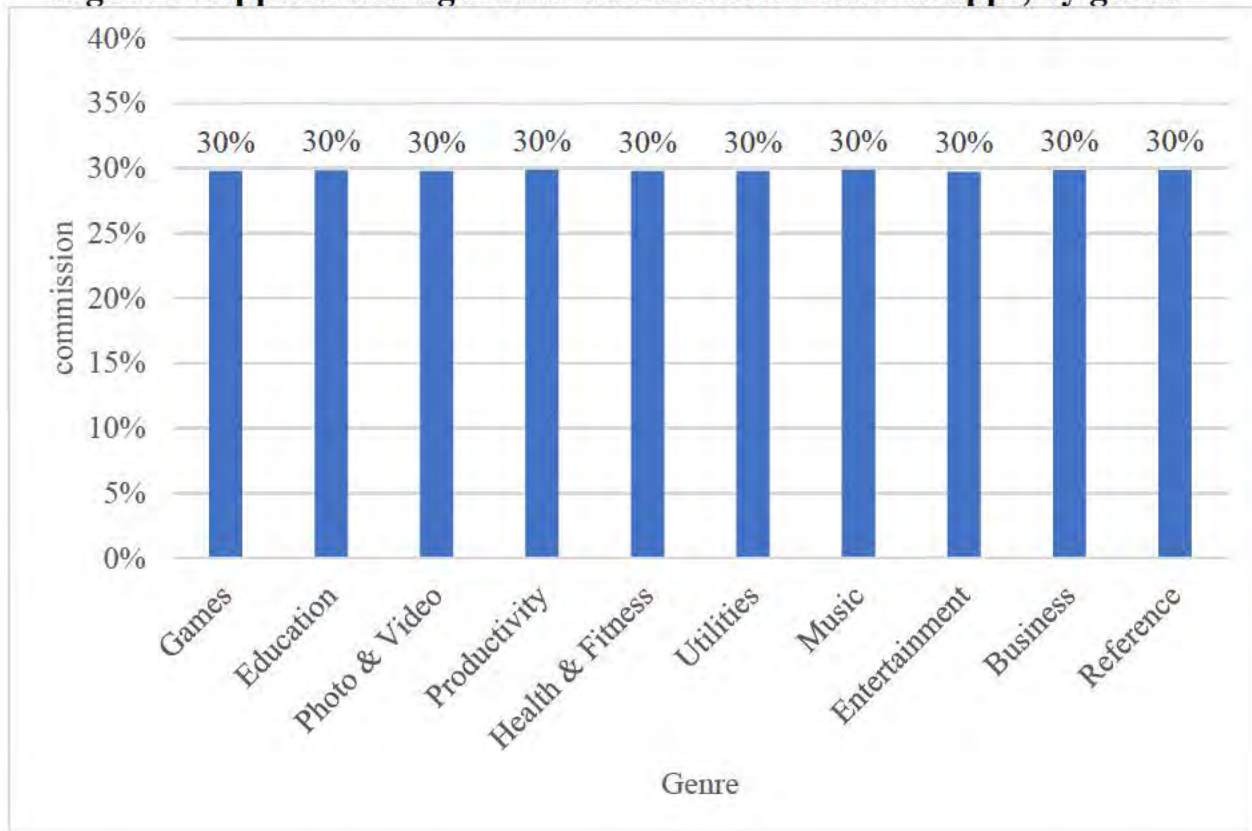
<sup>580</sup> Developer Class Complaint at ¶113.



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390. This mathematical error makes Prof. Hitt’s calculation of Apple’s average “initial download commission rate” particularly inaccurate because the revenue is zero (and therefore the commission rate *should* be mathematically undefined) for most initial downloads of apps of all genres. In contrast, if one uses the mathematically correct formula for Apple’s average commission for initial downloads (total commissions divided by total revenues), then the commission percentage is 30% for all genres (see Figure 8 below).

**Figure 8: Apple’s Average commission rates for sales of apps, by genre<sup>581</sup>**



391. *Second*, Prof. Hitt’s exhibits misleadingly suggest that Apple charges different commission percentages for different genres only because Prof. Hitt fails to account for the ways in which Apple actually *does* price discriminate. As noted above, Apple provides a discount relative to its default commission in two situations: (1) when a recurring subscription has lasted at least a year; and (2) when a developer

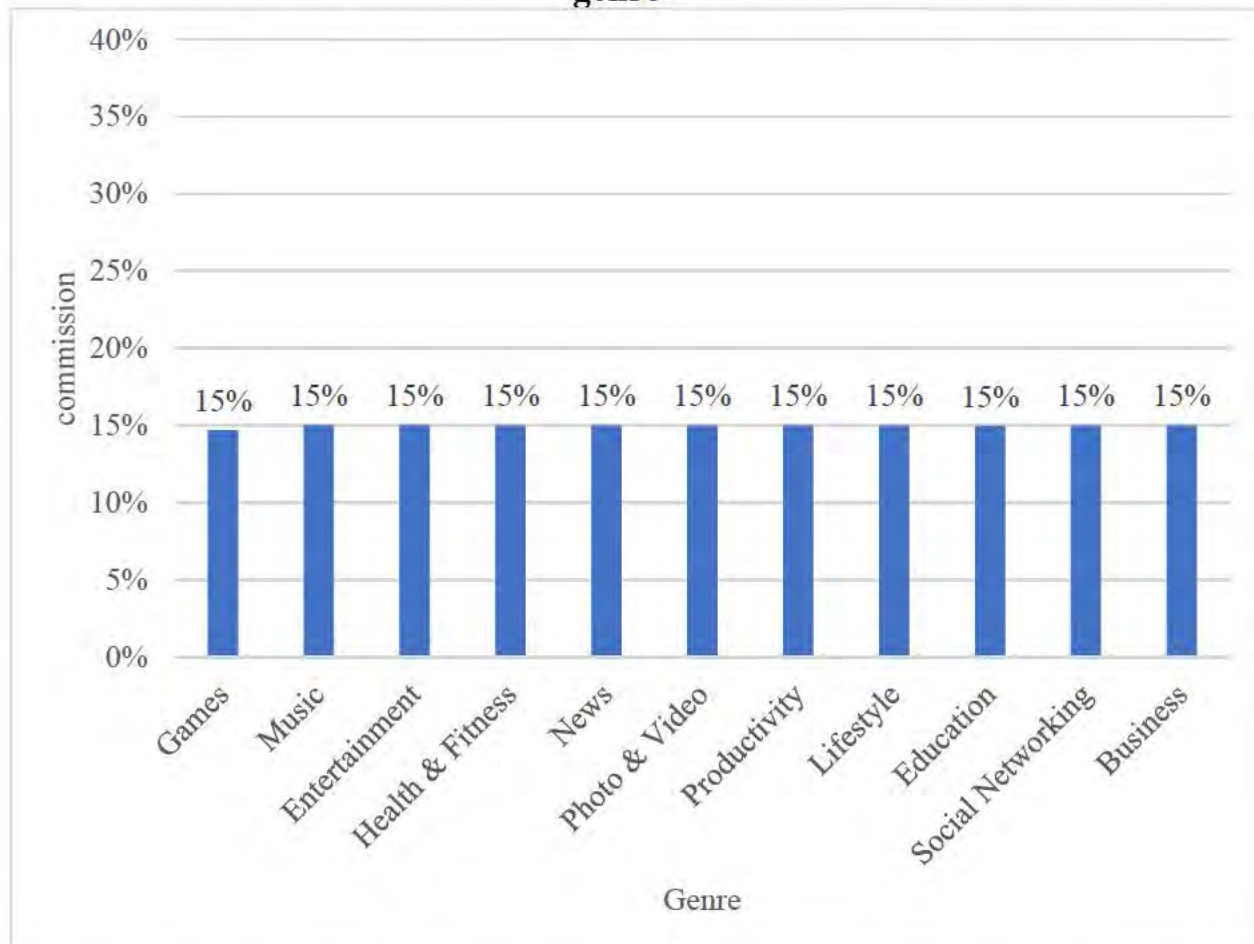
<sup>581</sup> “ELOC770 avg app sale commission during class period by genre.csv”. Limited to transactions during the class period, and the top 10 genres, as ranked by total revenue from app sales. The commission percentage is not always *exactly* equal to 30% because Apple rounds the developer royalty to the cent.

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enrolls in Apple’s Video Partner Program. Apple’s transaction data confirms that Apple applies this commission structure identically to all apps and developers, regardless of genre.

392. For example, Figure 9 below shows that Apple’s average commission for year-old subscriptions is approximately 15% for all genres, including games.

**Figure 9: Apple’s Average commission rates for year-old subscriptions, by genre<sup>582</sup>**



393. Because Apple has not yet produced data directly indicating which transactions received 15% commissions pursuant to the Video Partner Program, I cannot at this time create this same chart for the Video Partner Program.

<sup>582</sup> “ELOC770 avg year-old-sub commission during class period by genre.csv”. This calculation is limited to the time period after Apple adopted its year-old subscription policy (June 13, 2016). The commissions are not always exactly equal to 15% because of how Apple rounds developer royalties to the cent.



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Nonetheless, Apple’s transaction data contains [REDACTED] of transactions where: (a) the “genre” is “Games”; (b) the commission percentage is 15%; and (c) the subscription is not a year old yet, as indicated by the “proceeds reason” column being blank.<sup>583</sup> According to Apple’s 30(b)(6) deposition testimony, such transactions would indicate apps in the “Games” genre receiving a 15% commission pursuant to Apple’s Video Partner Program.<sup>584</sup>

*2. Apple’s Decision Not to Price Discriminate Based on Genre in the Actual World Indicates Apple’s Anticompetitive Conduct Would Impact Both Games and Non-Games*

394. As shown above, any purported differences in “competitive conditions” between game and non-game apps that Apple’s experts identified are evidently not sufficiently large to induce Apple to price discriminate between game apps and non-game apps in the actual world. This indicates that it is not profit-maximizing for Apple to price discriminate between games and non-games in the actual world. And I have seen no evidence indicating that (or Apple experts arguing that) it would for some reason be profitable for Apple to price-discriminate based on genre in the but-for world even though it evidently was not in the actual world.

## VI. THE ABSENCE OF PROCOMPETITIVE EFFECTS

395. The analysis above indicates that excluding almost all competition in iOS app distribution market has significant anticompetitive effects. Thus, absent procompetitive effects that are large enough to offset these anticompetitive effects, Apple’s challenged conduct must on balance be anticompetitive and inefficient as a matter of antitrust economics.

396. In antitrust economics, a “procompetitive effect” of some challenged conduct is an increase in consumer welfare<sup>585</sup> (such as from lower prices, higher quality, or a new product) that would not exist but for the challenged conduct. In contrast to anticompetitive conduct, which increases a firm’s profits by reducing

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<sup>583</sup> “ELOC770 suspected vpp genre counts.csv”.

<sup>584</sup> Mark Rollins (Apple 30(b)(6) on data issues) deposition at 338:1-342:19 (identifying VPP and SBA as only instances where there would be a 15% commission in Apple’s data and the “proceeds reason” (i.e., Subs 2.0) field would be blank).

<sup>585</sup> Because the relevant market at issue in this case is a two-sided market, the “consumers” in this case consists of both developers and mobile device users.

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competition from rivals, procompetitive conduct increases a firm’s profits by making the firm’s products more attractive to customers, for example by reducing price or improving product quality.

397. Although exclusive dealing agreements and requirements ties can have procompetitive effects in some cases, I have not found evidence that Apple’s use of those strategies had those procompetitive effects in this case. In the following sections, I address Apple’s arguments that its challenged conduct had procompetitive effects.

398. Apple argues that its exclusivity restraints on app distribution have the procompetitive effect of advancing consumer welfare by preventing consumers from using rival iOS app distributors who might allow them to install malicious or otherwise undesirable apps. But its exclusivity restraints do not have this procompetitive effect for the following reasons. (1) Without such exclusivity restraints, consumers who found a consumer welfare benefit from exclusive app distribution by Apple could simply choose to buy apps only through the App Store, so the exclusivity restraint is not causally related to achieving any posited consumer welfare gain for them. Instead, the exclusivity restraint has a causal effect only when it prevents consumers from making a different choice when they find their welfare would be enhanced by getting iOS app distribution from another source, and in that case the causal effect is to *reduce* consumer welfare. (2) Without Apple’s exclusivity restraints, Apple could still control which iOS apps are “secure” enough to run on iOS. Apple could simply determine which apps are secure enough to run on iOS without linking that approval to exclusive distribution of those apps on Apple’s iOS app stores. Indeed, without exclusivity restraints, Apple already does control which macOS apps are “secure” enough to run on macOS and could use a similar method for iOS. Or Apple could simply continue the same app review it already uses to approve iOS apps without linking that to any exclusivity restraint. (3) Without the exclusivity restraint that prevented competition in iOS app distribution, Apple would have actually had greater incentives to invest in sound app review to exclude apps that were not “secure.”

399. As for the argument that without exclusive distribution of iOS apps Apple would not have had incentives to invest as much in its iOS operating system, its device hardware, developer support, or its App Store, I conclude that Apple would have had incentives to make similar investments without iOS app exclusivity. This conclusion is confirmed by the investments made by Apple and other firms in all those facets when distributional exclusivity is absent.

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400. All of the methodologies, evidence, and conclusions in this Part are common to the class. None of the analysis contained in the following sections applies to some class members but not others.

***A. Prohibiting Consumers from Using Rival iOS App Distributions Does Not Increase Consumer Welfare, Even If Rival iOS App Distributors Are Less “Secure”***

401. Apple has argued that it excluded rival iOS app distributors in order to prevent developers from “circumventing” Apple’s app review process, which Apple says is intended to protect users from apps that “present a security risk” or “threatens the privacy of users.”<sup>586</sup> This claim fails for multiple reasons, as discussed in the following sections.

***1. Without Apple’s Exclusivity Restraints, Consumers Could Choose Which iOS App Distribution Methods Maximized Their Welfare***

402. But for Apple’s exclusivity restraints, consumers who believed, as Apple does, that Apple is better at identifying malicious apps than other app distributors would be free to obtain all of their apps from Apple solely through the App Store, just as they do currently. However, consumers who believed that other app distributors were better at identifying malicious apps, or who placed greater weight on other characteristics of app distributors (such as pricing or cross-platform compatibility), would be free to use alternative iOS app distributors. Restraining the freedom of consumers to choose which iOS app distributor to use therefore failed to increase the welfare of the consumers who believed that exclusive app distribution via Apple would protect them from malicious apps in a way that would increase their welfare, because those consumers could have chosen to exclusively buy through Apple without any restraint. In contrast, the exclusivity restraint had a negative effect on the welfare of the consumers who would have chosen an alternative iOS

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<sup>586</sup> Schiller Declaration In Support Of Apple Opposition to Epic Motion for Temporary Restrictive Order ¶ 21 (“If every developer is free to breach its contracts with Apple and allowed to circumvent the App review process, which is intended to assure, among other things, that no app that presents a security risk, threatens the privacy of users, or permits any software to be downloaded from outside of the secure App Store ecosystem, then Apple’s App Store cannot deliver the many benefits to consumers and developers that it currently does”); Schmalensee Decl. ISO Apple Opp. to Epic Mot. for Prelim. Inj. ¶32 (“Apple had the option to open up the iPhone and iPad completely, so that users could download apps from any source. This may have created additional pathways for developers of all sorts to reach iPhone users, but it also would have eliminated Apple’s ability to guarantee those users security, privacy, and a quality user experience, a distinguishing feature of Apple products since its inception”).

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app distributor if given the choice. On its *macOS* devices, Apple does not restrain this consumer freedom; in macOS, Apple provides a setting that allows users to choose whether to install apps only from the Mac App Store or also from other sources.<sup>587</sup>

403. Thus, restraining the ability of consumers to choose their preferred iOS distributor has no causal relationship to achieving the posited consumer welfare gain. Without the exclusivity restraint, consumers who found a consumer welfare benefit from exclusive app distribution by Apple could simply choose to buy apps only through the App Store. Instead, the exclusivity restraint has causal bite only when it prevents consumers from making a different choice when they find their welfare would be enhanced by getting iOS app distribution from another source, and in that case the causal effect on consumer welfare is *negative*.

*2. Apple Can Maintain a “Walled Garden” Around iOS Without Exclusivity  
Restraints on App Distribution*

404. Apple and its experts have argued that Apple exclusively distributing all iOS apps procompetitively increases security based on the following two premises:

- (a) It is procompetitive for Apple to maintain a “walled garden” around iOS by preventing the installation of malicious, immoral, fraudulent, or otherwise undesirable apps on iOS devices.
- (b) Apple must be the exclusive distributor of native iOS apps in order to maintain a “walled garden.”<sup>588</sup>

405. Even if one accepts Apple’s first premise that creating a “walled garden” by preventing the installation of undesirable iOS apps is procompetitive,

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<sup>587</sup> Apple, *Safely open apps on your mac* (available at <https://support.apple.com/en-us/HT202491>) (“By default, the security and privacy preferences of your Mac are set to allow apps from the App Store and identified developers. For additional security, you can chose to allow only apps from the App Store. In System Preferences, click Security & Privacy, then click General. Click the lock and enter your password to make changes. Select App Store under the header “Allow apps downloaded from.”).

<sup>588</sup> Rubinfeld 2021-02-16 report in *Epic v. Apple* ¶145 (“Epic alleges that the challenged technical and contractual licensing restraints work together to enable Apple to exercise control over what types of apps created with Apple-licensed software can and cannot be installed on users’ iOS devices. Even if correct, it is procompetitive for Apple to have this control. Apple’s app-review process, as codified in the App Review Guidelines, screens submitted apps in order to determine which apps are sufficiently high quality, safe, secure, and protecting of the user’s privacy.”).



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Apple’s second premise is incorrect because Apple could maintain a “walled garden” without exclusive app distribution. Without exclusive app distribution, Apple could still control which apps can be installed on iOS devices, by reviewing all iOS apps and programming iOS to install only apps that Apple has reviewed and approved. Thus, Apple’s objective of creating a “walled garden” by preventing undesirable apps from running on iOS is not a procompetitive effect of Apple’s exclusivity restraints because Apple can create such a “walled garden” without app distribution exclusivity.

406. Without exclusive distribution over iOS apps, Apple could clearly still control which apps can be installed on iOS because it already does that on macOS even though it does not require exclusive distribution of macOS apps. Apple has programmed macOS so that users can install only apps that Apple has “notarized.”<sup>589</sup> “Notarizing” a macOS app involves the following steps. First, the developer uploads the macOS app to Apple’s servers.<sup>590</sup> Second, Apple’s servers “scan the [the app] for malicious content.... If there are no issues, the notary service generates a ticket for [the developer] to staple to [the app].”<sup>591</sup> When a macOS user attempts to install the app, macOS will check whether it has been “notarized.”<sup>592</sup> If the app was not notarized by Apple, then macOS by default will not install the app (the user can manually change that setting in macOS).<sup>593</sup> Thus, the notarization requirement is *specific to the app, not the distribution method*. Consequently, macOS users by default can install apps from not only Apple’s Mac App Store, but also rival macOS

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<sup>589</sup> Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>) (“By default, macOS Catalina and later also requires software to be notarized, so you can be confident that the software you run on your Mac doesn't contain known malware.”).

<sup>590</sup> Apple Developer, *Notarizing macOS Software Before Distribution* (available at [https://developer.apple.com/documentation/security/notarizing\\_macos\\_software\\_before\\_distribution](https://developer.apple.com/documentation/security/notarizing_macos_software_before_distribution)) (describing the steps necessary for developers to notarize their macOS apps, which include “Choose Upload to send your archive to the Apple notary service.”).

<sup>591</sup> Apple Developer, *Notarizing macOS Software Before Distribution* (available at [https://developer.apple.com/documentation/security/notarizing\\_macos\\_software\\_before\\_distribution](https://developer.apple.com/documentation/security/notarizing_macos_software_before_distribution)).

<sup>592</sup> Apple Developer, *Notarizing macOS Software Before Distribution* (available at [https://developer.apple.com/documentation/security/notarizing\\_macos\\_software\\_before\\_distribution](https://developer.apple.com/documentation/security/notarizing_macos_software_before_distribution)) (“When the user first installs or runs your software, the presence of a ticket (either online or attached to the executable) tells Gatekeeper that Apple notarized the software.”).

<sup>593</sup> Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>).

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app distributors like Steam, *but only if Apple notarized the app*.<sup>594</sup> Thus, Apple has already programmed macOS so that it by default does not allow users to install any apps that Apple has not approved, but nevertheless still gives consumers the freedom to choose which app distribution method they want. Thus, but-for Apple’s challenged conduct, Apple could use notarization (or a similar method) to prevent the installation of an undesirable apps on iOS without requiring developers to distribute the Apple-approved apps exclusively through Apple.

407. Apple has claimed that applying the macOS “notarization” system to iOS would not sufficiently protect against the installation of undesirable apps on iOS because Apple’s notarization service currently does not involve any *human* review (it instead only uses computer programs to detect for malicious apps).<sup>595</sup> However, the iOS App Store’s App Review already relies primarily on computer programs, not humans; Apple’s human app reviewers typically spend only 6-12 minutes on each app.<sup>596</sup> Further, one of Apple’s uses of humans in app review is to identify (and reject) “immoral” content such as pornography,<sup>597</sup> but Apple does not now actually prevent accessing such “immoral” content on iOS devices. Indeed, one of Apple’s own native iOS apps, the Safari web browser, was *the* most popular mobile web browser used to access pornography at the beginning the of the class period.<sup>598</sup> Thus,

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<sup>594</sup> Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>) (“macOS Catalina and later also requires software to be notarized”); *id.* (“by default, the security and privacy preferences of your Mac are set to allow apps from the App Store and identified developers.”).

<sup>595</sup> Apple Developer, *Notarizing macOS Software Before Distribution* (available at [https://developer.apple.com/documentation/security/notarizing\\_macos\\_software\\_before\\_distribution](https://developer.apple.com/documentation/security/notarizing_macos_software_before_distribution)) (“Notarization is not App Review. The Apple notary service is an automated system that scans your software for malicious content.”).

<sup>596</sup> Kosymynka (Apple’s head of App Review) Deposition at 1001 (“... is it fair to say that app reviewers spend on average approximately 6 to 12 minutes reviewing an app? A: I think on [my] knowledge that sounds accurate, but there’s a lot of variables to a particular app. Some will take much less. Q: Sir, I’m just asking for an average. Average is 6 to 12 minutes, correct? A: Sounds accurate.”).

<sup>597</sup> Apple applies the “I’ll know it when I see it” (i.e., the human App Reviewers will know it when they see it) rule to identifying any undesirable content. *See* App Store Review Guidelines (available at <https://developer.apple.com/app-store/review/guidelines/>) (“We will reject apps for any content or behavior that we believe is over the line. What line, you ask? Well, as a Supreme Court Justice once said, ‘I’ll know it when I see it.’ And we think you will also know it when you cross it.”).

<sup>598</sup> Pornhub, Pornhub’s 2015 Year in Review (published January 6, 2016, available at <https://www.pornhub.com/insights/pornhub-2015-year-in-review>) (the Safari “browser dominates on the mobile front with” a 42.7% share of mobile web traffic on the pornography website Pornhub).



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Apple already lets pornography (and any other “immoral” content) onto its iOS devices; it just requires consumers to use Apple’s own native iOS app to access such pornography.

408. Moreover, Apple could incorporate human review into its app notarization service if it believes that is necessary prevent the installation of undesirable apps on iOS and thus make its iOS devices more valuable. Apple’s costs of human app review are very low in proportion to the profits that it generates from its iOS devices, even if one ignores Apple’s profits from iOS app distribution. Apple’s *worldwide* spending on human app review was at most [REDACTED] of Apple’s marginal profits on sales of iOS devices *in just the United States*.<sup>599</sup> Further, Apple could prevent overburdening or misuse of its human reviewing process the same way it does now; by continuing restricting the use of iOS App Review to developers who pay \$99/year to enroll in the Apple Developer Program<sup>600</sup> and remain in good standing with Apple.

409. Video game consoles provide additional proof that a “walled garden” can be created without exclusive distribution. The video game console manufacturers have not foreclosed all rival distribution of apps for their video game consoles. Consumers can install games on video game consoles not only by downloading the game’s data from the console manufacturers’ online app stores, but also by purchasing discs or cartridges that contain the game’s data from physical retailers, such as Amazon.com and Walmart.<sup>601</sup> In fact, before the video game console manufacturers created their online app stores, the console manufacturers often did not distribute *any* of their consoles’ apps. For example, Sony’s first PlayStation console predated Sony’s PlayStation store, so that consoles’ games were

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<sup>599</sup> Apple’s spending on human app review was at most [REDACTED] from Apple’s Q4FY16 (which began in July 2015, right after the class period started) to Apple’s Q42019 (which ended in September 2019). See APL-APPSTORE 09814097 (“Apple Inc” worldwide developer relations costs, by fiscal quarter. [REDACTED])

In contrast, Apple’s marginal profits just from the sales of iOS devices *in just the United States* during this same time period were [REDACTED]. See “ELOC323 apple ios device marginal profits Q4FY2015 to Q4FY2019.txt.” This statistic relies on Apple’s U.S. device sales data. See APLAPPSTORE08822222.xlsx. Marginal profits calculated as revenues minus standard costs.

<sup>600</sup> The Apple Developer Program costs \$99 per year. *Apple Developer, Choosing a Membership* (available at <https://developer.apple.com/support/compare-memberships/>) (“Enrollment is 99 USD per membership year.”).

<sup>601</sup> See, e.g. Amazon.com listing for a physical copy of the PlayStation 5 game “Demon’s Souls” (available at <https://www.amazon.com/Demons-Souls-PlayStation-5/dp/B08FC5TTBF>).

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distributed exclusively by other firms.<sup>602</sup> Even though video game console manufacturers have not required exclusive distribution of apps for their consoles, they nevertheless have maintained a “walled garden” around their consoles by preventing consumers from installing apps that the console manufacturers have not approved. For example, Sony’s first PlayStation console included special technology that detected when users attempted to play unapproved, pirated, or illegally copied games.<sup>603</sup> Nowadays, Sony continues to maintain its walled garden around the PlayStations 4 and 5, without requiring exclusive app distribution, using a variety of techniques designed to prevent the consoles from playing unapproved apps.<sup>604</sup> This evidence further confirms creating a walled garden is not a procompetitive effect of app distribution exclusivity because firms can and have created walled gardens without engaging in Apple’s challenged conduct.

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<sup>602</sup> Sony’s first PlayStation console was launched in the United States in 1995. *History of the PlayStation* (available at <https://www.ign.com/articles/1998/08/28/history-of-the-playstation>) (“The PlayStation launched in the United States on September 9, 1995 to instant success.”). Sony did not launch its online PlayStation network until over a decade later, in 2006. *History of PlayStation Network* (available at <https://historydraft.com/story/play-station-network/timeline/584>).

<sup>603</sup> Rick Wilder, *PS1 Modding – A History of PlayStation Piracy: Part I* (published April 11, 2020, available at <https://techstomper.com/ps1-modding-a-history-of-playstation-piracy-part-i/>) (Sony implemented a ‘wobble groove’ on the inner rim of every PlayStation disc. Containing the region information of the game and requiring specialized technology beyond any consumer-grade burner to replicate, this groove doubled up as a form of copy protection. Allegedly, the reasoning behind the iconic black coating on every genuine PlayStation disc was for its ‘anti-piracy properties.’ The article goes on to mention additional ways Sony restricted the use of unapproved games without requiring exclusive distribution).

<sup>604</sup> PS4 Experts, *How Will the Playstation 4 Combat the Growing Issue of Game Piracy?* (available at <https://www.ps4playstation4.com/how-will-playstation-4-combat-growing-issue-game-piracy>) (“The PS3 remains un-hacked ,and backup/pirated copies [of games] unplayable. ... Sony has accomplished this through various means ... the console uses a system of checks and balances from various different devices in the system, including an untouchable 7<sup>th</sup> Cell, that have rendered the attempts of hackers to infiltrate the system futile.”); Any Maxwell, *PS4 Piracy Now Exists – If Gamers Want to Jump Through Hoops* (published September 30, 2017, available at <https://torrentfreak.com/ps4-piracy-now-exists-if-gamers-want-to-jump-through-hoops-170930/>) (“Mainstream piracy on the current generation of gaming consoles is pretty much non-existent, with the PS4 and Xbox One standing firm in the face of determined hackers. Now, however, a flurry of PS4 games including GTA V and Far Cry 4 has hit the web. That being said, it’s doubtful that many gamers will jump through the hoops required to play them.”).



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### *3. In the But-For World, Apple Would Have Had Incentives to Invest Even More in App Review*

410. As I explain in more detail below in Section B.3, increased competition in the but-for world would have given Apple incentives to invest even *more* in App Review than it did in the actual world. Increased investment in app review spurred by competition would have made Apple even better at identifying malicious apps, and thus improved security. This is not to say that Apple is currently “bad” at app review, but instead only that competition would spur Apple to improve its app review quality, just as competition in the markets for cars spurs each manufacturer to improve the safety of their cars, even though all cars already include hundreds of safety features. And, as much as Apple likes to trumpet its app review process, there is undeniably still room for it to improve. The computer science expert Apple retained in the Epic v. Apple litigation, Prof. Rubin, acknowledged that Apple’s app review is not “perfect” and that there have been “incidences of new malware finding its way onto the App Store.”<sup>605</sup>

### ***B. The Evidence Does Not Indicate the Existence of Procompetitive Investments That Apple Would Not Have Made But For Its Challenged Conduct***

411. Apple and its experts have identified numerous investments that Apple made that they claim benefited consumers and/or developers. For example, Apple has noted that it invested in improvements in iOS device hardware (such as the gyroscope), developer support, and the iOS App Store itself.<sup>606</sup> However, merely pointing out that an investment benefited consumers does *not* establish that the investment is procompetitive effect of *Apple’s challenged conduct*. To show that Apple’s challenged conduct induced an investment, Apple must establish that Apple would not have made that investment but for Apple’s challenged conduct. As applied here, that means a particular investment is not a procompetitive effect of Apple’s challenged conduct unless Apple establishes *both* of the following premises:

- (1) the investment benefits consumers and/or developers
- (2) Apple would *not* have made the investment but for Apple’s challenged conduct (i.e., that Apple would not have made the investment if it had faced significant competition in the iOS app distribution market).

412. Thus far, neither Apple nor any of its experts have attempted to provide evidence supporting the second premise (that Apple would not have made the same

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<sup>605</sup> Rubin 2021-03-15 report in Epic v. Apple ¶¶191-192.

<sup>606</sup> Hitt 2021-03-15 Rebuttal Report Appendix F (listing “Selected Apple innovations that have benefited the App Store”).

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investment but-for the challenged conduct) for any investments. If Apple’s experts eventually opine that there are particular investments Apple would not have made in the but-for world, I will analyze those opinions in my rebuttal report.

413. In the meantime, I show below that there is evidence affirmatively indicating that Apple would have made the same investments in a but-for world with increased competition in the iOS app distribution market, including the same investments in:

1. The iOS operating system and hardware,
2. iOS developer support, and
3. the iOS App Store.

*1. Apple’s Investments in the iOS Operating System and Hardware Would Have Been Made in The But-For World Too*

414. Apple and its experts note several investments Apple has made in its iOS hardware and/or iOS operating system that have benefited consumers and/or developers, such as: (1) the gyroscope in Apple’s iPhones; (2) the camera; (3) the “retina” (high resolution) display; and (4) the “sandbox” environment for apps in its operating system.<sup>607</sup>

415. However, neither Apple nor any of its experts have argued that Apple’s *challenged conduct* (foreclosing the iOS app distribution market) was necessary to induce these investments. In other words, neither Apple nor any of its experts have asserted that these investments would not have been profit-maximizing if Apple had faced greater competition in the iOS app distribution market. Thus, Apple has not actually established that any of these innovations are procompetitive effects of its challenged conduct.

416. Further, the evidence affirmatively indicates that Apple would have made these same investments in the iOS operating system and iOS device hardware if Apple had faced increased competition in the iOS app distribution market. Specifically:

- a. The marginal returns to Apple’s investments in the iOS operating system and iOS device hardware would not be significantly different in the but-for world;

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<sup>607</sup> See, e.g. Hitt 2021-03-15 Rebuttal Report Appendix F (listing “Selected Apple innovations that have benefited the App Store.”).

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- b. Apple makes similar investments in the macOS operating system and devices, even though Apple’s Mac App store faced significant competition from rival macOS app distributors and direct distribution of macOS apps; and
- c. Samsung makes similar investments in its smart phone and tablet devices, even though only 2% of app distribution revenue on Samsung devices are through Samsung’s Galaxy Store, and its app distribution profits are accordingly trivial in relation to the profits Samsung earns on sales of smart phones and tablet devices.

a. The Marginal Returns to Apple’s Investments in the iOS Operating System and iOS Device Hardware Would Not Be Significantly Different in the But-For World

417. Economics assumes that a firm will make a particular investment if it has a positive “net present value” (“NPV”), i.e., if the future increases in the firm’s profits (discounted for the time-value of money) caused by the investment would exceed the cost to the firm of making the investment.<sup>608</sup> Thus, Apple would make a particular investment in the actual world but not in the but-for world only if the investment had a positive NPV in the actual world but a negative NPV in the but-for world. The key difference between the actual and but-for worlds here is that in the actual world Apple faced no significant competition from rival iOS app distributors or direct distribution of iOS apps, but Apple would face such competition in the but-for world. Therefore, Apple would make a particular investment in the actual world but not the but-for world only if significant competition from rival iOS app distributors and direct distribution of iOS apps would reduce the NPV of the investment so much that it became negative.

418. The only plausible way in which increased competition in the iOS app distribution market could reduce the NPV of an Apple investment in iOS hardware or the iOS operating system would be if the investment increased Apple’s profits in part by increasing Apple’s profits from iOS app distribution.<sup>609</sup> For example, suppose that Apple’s investment in adding a gyroscope to the iPhone caused more consumers to buy iPhones instead of Android phones, and consequently caused more consumers to buy the iPhone version of particular games instead of the Android

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<sup>608</sup> RONALD W. HILTON, *MANAGERIAL ACCOUNTING* (9<sup>th</sup> Ed. 2011), p. 688 (“Compute the present value of each cash flow, using a discount rate that reflects the cost of acquiring investment capital. ... If the net present value (NPV) is equal to or greater than zero, accept the investment proposal. Otherwise, reject it.”).

<sup>609</sup> There is no evidence or good reason to think that introducing competition from rival iOS app distributors would increase the cost to Apple of making the same investments.

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version. Then the investment in the gyroscope would increase Apple's profits in part by increasing the sales of iOS devices and in part by increasing the number of transactions on which Apple earns a commission in the App Store. And if competition from rival iOS app distributors caused Apple to charge a smaller percentage commission on each app distribution transaction, or to be the distributor for a smaller share of each app distribution transaction, then that competition would reduce the extent to which the gyroscope investment increased Apple's profits from iOS app distribution.

419. However, the evidence indicates that investments in the iOS operating system and iOS device hardware increase Apple's profits almost exclusively by increasing the demand for iOS hardware (rather than demand for iOS apps and in-app products), and thus that reducing Apple's profits from iOS app distribution will not have a significant effect on the NPV of such investments. To begin with, iOS device sales account for [REDACTED] of Apple's profits from iOS device sales and iOS app distribution combined.<sup>610</sup> Further, investments in iOS device hardware and/or the iOS operating system generally increase the demand more for iOS devices than for iOS apps and in-app content. The [REDACTED] of iOS device users never make a purchase on the App Store that results in a commission for Apple,<sup>611</sup> so an investment in the iOS operating system or iOS device hardware that induces a consumer to purchase an iPhone often will have no effect on Apple's commissions from the App Store for most consumers.

420. Consequently, even though increased competition from rival iOS app distributors would reduce Apple's profits from the sales of iOS apps and in-app products, it would not significantly reduce the profits Apple earns specifically from investments in iOS hardware and the iOS operating system. Because Apple's investments in iOS hardware and the iOS operating system would increase Apple's profits by a similar amount in both the actual world and but-for world, one would expect these investments to be profitable for iOS in both the actual world and but-for world.

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<sup>610</sup> "ELOC330 apple marginal profits from app store and devices during class period.csv". This statistic was calculated from 4Q2018 to 3Q2019 (calendar years), which is the set of quarters for which I currently have both Apple device marginal profit data and App Store marginal profit data.

<sup>611</sup> "ELOC736 pct of consumers contributing to app store commission.csv". This statistic is calculated during the class period only.



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b. Apple Makes Similar Investments in the macOS Operating System and macOS Devices Even Though Apple Competes Against Rival macOS App Distributors

421. Because Apple does not use the challenged conduct in the macOS app distribution market, Apple’s investments in the macOS operating system and hardware provide a sound economic indicator of the extent to which Apple would invest in the iOS operating system and hardware if Apple did not use the challenged conduct in the iOS app distribution market, and consequently faced greater competition. The evidence shows that Apple makes enormous investments in its macOS operating system and hardware, just like it does in the iOS operating system and hardware. For example, Apple invested in designing its new M1 computing chip “specifically for the Mac.”<sup>612</sup> Apple even stated that the M1 chip it designed specifically for Mac devices was “by far the best chip [Apple] has ever created,” making clear that Apple does not invest less in its macOS devices than it does in its iOS devices.<sup>613</sup> Further, Apple continuously updates its macOS operating system, just like it continuously updates the iOS operating system.<sup>614</sup>

c. Samsung Makes Similar Investments in Samsung Phones Even Though Samsung Earns Little Profits from App Distribution

422. Samsung, like Apple, sells smart phones and tablets (Samsung Galaxy phones, which run on the Android OS) and operates its own app marketplace (the Galaxy Store, which works on Samsung smart phones). Although Samsung charges developers a commission when users purchase apps through Samsung’s Android application store (called the “Samsung Galaxy Store”), all Samsung phones come with both the Galaxy Store and Google’s Play Store installed, and therefore users of

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<sup>612</sup> Apple Newsroom, *Apple unleashes M1* (published November 10, 2010, available at <https://www.apple.com/newsroom/2020/11/apple-unleashes-m1/>).

<sup>613</sup> Apple Newsroom, *Apple unleashes M1* (published November 10, 2010, available at <https://www.apple.com/newsroom/2020/11/apple-unleashes-m1/>) (“With its unique combination of remarkable performance, powerful features, and incredible efficiency, M1 is by far the best chip we’ve ever created”).

<sup>614</sup> See, e.g. Apple Newsroom, *macOS Big Sur is here* (published November 12, 2020) (“Update brings a fresh, new design, enhancements to Safari, Messages, Maps, and privacy, and is engineered for Apple’s powerful M1 chip.”); Apple Newsroom, *macOS Catalina is available today* (published October 7, 2019, available at <https://www.apple.com/newsroom/2019/10/macOS-catalina-is-available-today/>) (“security improvements in Catalina better protect macOS from tampering, help ensure apps are safe, and give users greater control over access to their data.”).

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Samsung smartphones are not required to use Samsung’s Galaxy Store.<sup>615</sup> Further,

[REDACTED]<sup>616</sup> Consequently, Samsung’s revenues from designing and manufacturing smartphones come almost exclusively from the sale of smartphones, rather than through developer commissions on Samsung’s Galaxy Store.<sup>617</sup> Samsung’s investments in its smartphone hardware therefore provide a sound economic indicator into how much Apple would invest in its smartphone hardware in the extreme scenario where it earned almost no profits from iOS app distribution.

423. The evidence indicates that Samsung invests in its smart phone and tablet hardware to a comparable, or possibly even greater, degree than Apple does. Just like iPhones, Samsung smartphones have accelerometers, capacitive multi-touch touchscreens, advanced cameras, network access, GPS, advanced CPUs, gyroscopes and high-resolution displays, among other features.<sup>618</sup> In fact, Samsung has developed several smart phone innovations before Apple did, such as folding

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<sup>615</sup> Samsung, Where can I find the Google Play Store on my Samsung Galaxy Device? (available at [www.samsung.com/ie/support/mobile-devices/where-can-i-find-the-google-play-store-on-my-samsung-galaxy-device/](http://www.samsung.com/ie/support/mobile-devices/where-can-i-find-the-google-play-store-on-my-samsung-galaxy-device/)) (“The Play Store comes pre-installed on all Samsung smartphones.”).

<sup>616</sup> GOOG-APPL-00112321 at GOOG-APPL-00112325 (August 2019 internal Google document indicating [REDACTED]).

<sup>617</sup> Samsung’s revenues from smartphone sales in the United States were over 800 times higher than its revenues from the Galaxy App Store in the United States in both 2018 and 2019 (the two years for which I can calculate this statistic). “ELOC353 US samsung revenue, smartphone vs galaxy app store.csv”. I rely on SEA00041448 for Samsung’s revenues from the Galaxy App Store in the United States, and I rely on IDC data (produced as part of Prof. Evan’s backup) for Samsung’s revenues from smartphone sales in the United States.

<sup>618</sup> See, e.g., Steven Winkelman, *Apple iPhone 12 vs. Samsung Galaxy S21: Which Flagship Takes the Crown?* (published January 15, 2021, available at <https://www.pcmag.com/news/apple-iphone-12-vs-samsung-galaxy-s21-which-flagship-takes-the-crown>)

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screens,<sup>619</sup> AMOLED displays,<sup>620</sup> high-refresh rate displays,<sup>621</sup> bezel-less displays,<sup>622</sup> and a dual-aperture camera.<sup>623</sup>

*2. Apple’s Investments in Developer Support Would Have Been Made in the But-For World Too*

424. Apple and its experts have noted that Apple provides support to iOS developers, for example with its Xcode software that developers can use to design, program, and test iOS apps.<sup>624</sup> However, thus far, Apple has not asserted that its challenged conduct *caused* Apple to make these investments in developer support, and therefore Apple has not actually even made the argument that these developer tools were a procompetitive effect of the challenged conduct.

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<sup>619</sup> Samsung’s Galaxy Z Fold and Galaxy Z Flip phones have folding screens. <https://www.samsung.com/us/mobile/galaxy-fold/> ; <https://www.samsung.com/us/mobile/galaxy-z-flip/>. Apple has not yet released a single phone or tablet with a folding screen. Mark Gurman, Apple Considers Foldable iPhone (published January 15, 2021, available at <https://www.bloomberg.com/news/articles/2021-01-15/apple-considers-foldable-iphone-minor-changes-planned-for-2021-models>) (Apple “has developed prototype foldable screens for internal testing, but hasn’t solidified plans to actually launch a foldable iPhone. The development work hasn’t expanded beyond a display, meaning Apple doesn’t yet have full handset prototypes in its labs”).

<sup>620</sup> <https://news.samsung.com/global/10-for-10-highlights-from-a-decade-of-galaxy-innovation> (“AMOLED Display. Introduced for the first time on a smartphone with Galaxy S in 2010.”).

<sup>621</sup> See, e.g., Steven Winkelman, *Apple iPhone 12 vs. Samsung Galaxy S21: Which Flagship Takes the Crown?* (published January 15, 2021, available at <https://www.pcmag.com/news/apple-iphone-12-vs-samsung-galaxy-s21-which-flagship-takes-the-crown>) (Samsung’s “S21 and S21+ both feature AMOLED displays with an 120Hz adaptive refresh rate that changes from 48Hz to 120Hz depending on how you use the phone. . . . None of the iPhone 12 models has a 120 Hz refresh rate . . . Samsung phones’ adaptive refresh rate is a spectacular feature for gaming or even scrolling through social media feeds.”).

<sup>622</sup> <https://news.samsung.com/global/10-for-10-highlights-from-a-decade-of-galaxy-innovation> (“Following the legacy of the Galaxy Note edge, which introduced the world’s first curved display for improved grip and increased screen real estate, the Galaxy S8 (2017) saw the introduction of the Infinity Display, which features a bezel-less design for a fully immersive viewing experience.”).

<sup>623</sup> <https://news.samsung.com/global/10-for-10-highlights-from-a-decade-of-galaxy-innovation> (“The Galaxy S9 (2018) was the first smartphone to feature a Dual Aperture camera, a pioneering camera innovation that performs well in low light conditions”).

<sup>624</sup> See Hitt 2021-03-15 Rebuttal Report in *Epic v. Apple*, Appendix F, pp. 8-13 (listing “Developer tools” that Apple has created).



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425. Further, the following evidence affirmatively indicates that Apple would continue to provide the same developer support in the but-for world:

- a. The marginal returns to Apple’s investment in iOS developer support would be similar in the but-for world.
- b. Apple provides the same support to macOS developers even though Apple does not use the challenged conduct in the macOS app distribution market.

a. The Marginal Returns to Apple’s Investment in iOS Developer Support Would Be Similar in the But-For World.

426. As explained above, Apple would make a particular investment in the actual world but not in the but-for world only if the investment had a positive NPV in the actual world but a negative NPV in the but-for world. Thus, Apple would make a particular investment in developer support in the actual world but not in the but-for world only if increased competition in the iOS app distribution market would reduce the NPV of the investment to Apple so much that it became negative.

427. The only plausible way in which increased competition in the iOS app distribution market could reduce the NPV of an Apple investment in iOS developer support would be if the investment increased Apple’s profits in part by increasing Apple’s profits from the App Store.<sup>625</sup> For example, suppose that Apple’s investment in the iOS software development kit resulted in higher quality apps, and therefore higher demand for the iOS devices and iOS apps. Then the investment in the iOS software development kit (“SDK”) would increase Apple’s profits in part by increasing the sales of iOS devices and in part by increasing the number of transactions on which Apple earns a commission in the App Store. And if increased competition in the iOS app distribution market caused Apple to charge a smaller percentage commission on each app distribution transaction, or to be the distributor for a smaller share of iOS app or IAP transactions, then that competition would reduce the extent to which the SDK investment increased Apple’s profits from the App Store.

428. Apple executives and experts have acknowledged that the development of iOS apps increases Apple’s profits primarily by increasing sales of Apple’s iOS devices. Apple’s CEO at the time the iPhone launched, Steve Jobs, stated in an interview that “Our purpose in the App Store is to add value to the iPhone. Free apps

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<sup>625</sup> It is not plausible that introducing competition from rival iOS app distributors would increase the cost to Apple of making the same investments.



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do that just as well as paid apps sometimes. We love free apps.”<sup>626</sup> Similarly, Steve Jobs stated on an earnings call for Apple’s FY2008Q4 that “Competitors are scrambling to copy our App Store but it’s not as easy as it looks and we are far along in creating the virtuous cycle of cool applications begetting more iPhone sales, thereby creating an even larger market which will attract even more iPhone software development.”<sup>627</sup> Similarly, Apple has stated in 10-K filings that it “believes decisions by customers to purchase its hardware products depend in part on the availability of third-party software applications and services.” And one of Apple’s experts in *Epic v. Apple*, Prof. Schmalensee, co-authored a book that explains that “third-party apps were important for getting users interested in [Google and Apple] smartphones. Apple and Google both invested great effort in stoking the supply of third-party apps, touting how many they had, and making it easy for users to get them.”<sup>628</sup> These statements are consistent with Apple’s data, which show that iOS device sales account for the [REDACTED] of Apple’s profits from iOS device sales and iOS app distribution combined.<sup>629</sup>

429. Because increasing the quantity and quality of iOS apps increases Apple’s profits primarily by increasing demand for iOS devices, a reduction in Apple’s profits in the iOS App Store caused by additional competition in the but-for world would not significantly affect Apple’s incentive to invest in iOS developer support.

b. Apple Provides the Same Support to macOS Developers Even Though Apple Does Not Use the Challenged Conduct in the macOS App Distribution Market

430. Because Apple does not use the challenged conduct in the macOS app distribution market, the support Apple provides to macOS developers in the actual world provides a sound economic indicator of the level of support Apple would provide to iOS developers but-for the challenged conduct. And Apple executives have repeatedly testified that Apple provides the same level of developer support to iOS developers and macOS developers. For example, C.K. Haun, Apple’s Senior Director for Developer Technical Services, testified that the support that Apple provides to macOS developers is “substantially identical” to the support it provides

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<sup>626</sup> APL-APPSTORE\_04659313

<sup>627</sup> <https://seekingalpha.com/article/100980-apple-f4q08-qtr-end-9-27-08-earnings-call-transcript>

<sup>628</sup> David Evans & Richard Schmalensee, MATCHMAKERS: THE NEW ECONOMICS OF MULTISIDED PLATFORMS 117.

<sup>629</sup> See *supra* note 610.

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to iOS developers.<sup>630</sup> He also testified that that Apple provides “substantially the same” support to all macOS developers, regardless of whether they “predominately distribute through the [Mac] App Store rather than other channels.”<sup>631</sup> Craig Federighi, Apple’s Senior Vice President of Software Engineering, likewise testified that Apple hires “high quality teams” for both iOS developer support and macOS developer support, and one team is not “better” than the other.<sup>632</sup>

*3. Apple’s Investments in the App Store Would Have Been Made in the But-For World Too*

431. One of Apple’s experts, Prof. Rubinfeld, has argued that direct competition from rival iOS app distributors in the but-for world would “reduce Apple’s incentive to invest in the development of the App Store.”<sup>633</sup> However, Prof. Rubinfeld cited neither any evidence nor any economic literature supporting this claim. And to the contrary, economic literature and the evidence in this case both indicate that increased competition from rival iOS app distributors in the but-for world would cause Apple to *increase* its investments in the App Store.<sup>634</sup> Put simply, the increased competition from rival iOS app distributors would force Apple to compete not just on price (i.e., developer commissions), but also on quality (e.g., the speed and quality of app review).

432. As noted above, a firm’s incentive to make a particular investment is larger the more the investment increases the firm’s profits. The theoretical economic

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<sup>630</sup> Haun January 13, 2021 deposition at 18 (“Q: Your team provides the same level of support for a Mac OS developer that it provides for an iOS developer? A: They are substantially identical efforts”).

<sup>631</sup> Haun January 13, 2021 deposition at 19 (“Q: You provide substantially the same support to a Mac OS developer who distributes outside of the App Store as you would to a Mac OS developer who distributes through the App Store? A: Yes.”).

<sup>632</sup> Federighi February 10, 2021 Deposition at 279-281.

<sup>633</sup> Rubinfeld 2021-02-16 report in *Epic v. Apple* ¶75 (“Imposing a requirement that Apple allow software developers that use Apple software to distribute native iOS apps outside the App Store would reduce Apple’s incentive to invest in the development of its App Store. This would allow free riding, and more broadly, would reduce Apple’s incentive to engage in innovation-driven research and development.”).

<sup>634</sup> To be clear, in this section I focus on investments that specifically relate to the App Store (e.g. app review), as opposed to investments in the iOS operating system, iOS device hardware, or iOS developer support. Prof. Hitt appears to acknowledge this distinction. *See also* Hitt 2021-03-15 rebuttal report in *Epic v. Apple* Appendix F, pp. 18-19 (listing the following “Storefront” innovations “that have benefited the App Store”: App Store, Game Center, iMessage Apps, App Store “redesign” in 2017, and “App Clips.”).

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literature shows that competition can increase a firm’s marginal return on its investments,<sup>635</sup> and the empirical literature generally often finds higher rates of innovation in more competitive industries.<sup>636</sup> Introducing competition from close substitutes can increase an incumbent’s incentive to invest in two ways. *First*, investments can increase a firm’s market share only if the firm competes against close substitutes. For example, in the actual world Apple obtains a near-100% share of the iOS app distribution market regardless of how much it invests in the App Store’s app recommendation algorithm<sup>637</sup> because Apple’s restraints have excluded almost all competition in the market. In contrast, if Apple faced significant competition in the iOS app distribution market, increased investment in the App Store app recommendation algorithm could increase Apple’s share of the iOS app distribution market. *Second*, when a firm competes against close substitutes, investments in product features can differentiate its products from its rivals’ products, which tends to increase the profit-maximizing prices of all firms’ products.<sup>638</sup>

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<sup>635</sup> Aghion, Bloom, Blundell, Griffith & Howitt, *Competition and Innovation: An Inverted-U Relationship*, 120 QUARTERLY JOURNAL OF ECONOMICS 701, 702 (2005) (“Innovation incentives depend not so much upon *postinnovation* rents, . . . but upon the *difference* between *postinnovation* and *preinnovation* rents of incumbent firms. In this case, more competition may foster innovation and growth, because it may reduce a firm’s pre-innovation rents by more than it reduces its postinnovation rents. In other words, competition may increase the incremental profits from innovating, and thereby encourage R&D investments aimed at ‘escaping competition.’”) (emphasis in original)

<sup>636</sup> Aghion, Bloom, Blundell, Griffith & Howitt, *Competition and Innovation: An Inverted-U Relationship*, 120 QUARTERLY JOURNAL OF ECONOMICS 701 (2005) (“empirical work finds that [innovation] increases [with competition].” Citing Geroski (1995), Nickell (1996), and Blundell, Griffith, and Van Reened (1999). “This paper reexamines this relationship using panel data and finds clear nonlinearities in the form of an inverted-U shape”).

<sup>637</sup> An application distributor’s “app recommendation algorithm” is the algorithm the distributor uses to select which apps to recommend to each user. Such algorithms can potentially be very simple (such as simply recommending the apps that have paid the distributor the most to recommend them) or quite complex (such as tailoring the recommendation to information the app distributor has about each consumer, such as their demographic information, friend network, or internet activity. *See, e.g.*, Melville & Sindhvani, *Recommender Systems*, in the *Encyclopedia of Machine Learning* (2010) (discussing recommendation algorithms generally).

<sup>638</sup> TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 278 (1988) (“product differentiation establishes clienteles (‘market niches,’ in the business terminology) and allows firms to enjoy some market power over these clienteles”); *id.* at 286-286 (“Product differentiation is meant to relax price competition. In some instances, there may exist legal or technical reasons why the scope of price competition is limited. . . It is . . . clear that the incentive to differentiate products decreases when firms do not compete in prices.”).

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433. In sum, the economic literature contradicts Prof. Rubinfeld’s assumption that introducing competition to the iOS app distribution market will cause Apple to invest less in the App Store.

**VII. CONSUMERS ALSO SUFFERED ANTICOMPETITIVE HARM**

434. Because the iOS app distribution market is a two-sided market, I have also analyzed the effect of Apple’s challenged conduct on consumers in the market (i.e., people who purchase iOS apps or purchase digital products within iOS apps). I conclude that Apple’s anticompetitive conduct harmed consumers of iOS apps and in-app content. Section A below explains that restricting consumers’ choice of iOS app distributor directly reduces consumer welfare, even if one conservatively assumes that the number and quality of apps and IAPs would be exactly the same in the but-for world as they were in the actual world. Section B explains that anticompetitively inflating the commission Apple charged developers also harmed consumers by reducing the quantity and quality of iOS apps and in-app content. Relatedly, Part VI.A.1 addresses Apple’s incorrect claim that restricting consumers’ choice of iOS app distributor increases consumer welfare by forcing consumers to rely exclusively on Apple’s app review.

435. Because Apple’s challenged conduct has anticompetitively harmed both sides of the domestic iOS app distribution market (developers and consumers) it was necessarily anticompetitive on net when one considers both sides of the market.

436. The conclusion about whether Apple’s challenged conduct was anticompetitive, after accounting the effects on both sides of the market, is necessarily common to the Developer Class. The conclusion is, by definition, the same for each and every developer (and each and every consumer) regardless of whether only some developers or some consumers were harmed. Put another way, the conclusion about the combined effect of the challenged conduct on both sides of the market does not depend on whether each individual Developer had an injured-user customer, but instead on the sum of the effects of the conduct across all developers and all consumers.



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***A. Restricting Consumers’ Choice of iOS App Distributors Directly Reduced Consumers’ Welfare***

437. Prohibiting iOS device owners from using rival iOS app distributors directly reduced consumers’ welfare because it restricted consumers’ choices. Economics generally assumes that, when presented with multiple options, consumers choose the option that maximizes their welfare.<sup>639</sup> Therefore, forcing all consumers to use a particular option necessarily reduces consumer welfare unless consumers *never* would have chosen alternative options if given the choice.

438. Applying that economic logic here means that Apple’s exclusivity restraints against consumers using rival iOS app distributors necessarily reduced consumer welfare by restricting consumers’ choices if any consumers ever would have used rival iOS app distributors in the but-for world. At least three types of evidence affirmatively show that a significant number of consumers would have chosen to use rival iOS app distributors if given the choice. *First*, on macOS, where users can use Apple’s Mac App Store or alternative methods to install macOS apps, they use alternatives to the Mac App Store about 58% of the time.<sup>640</sup> *Second*, before Apple made jailbreaking iPhones significantly harder, millions of consumers were using the leading iOS application distributor for jailbroken iPhones (Cydia).<sup>641</sup> *Third*, on Windows, where users can use the Microsoft Store or alternative methods

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<sup>639</sup> PINDYCK & RUBINFELD, MICROECONOMICS 68 (8<sup>th</sup> ed. 2013) (“Given their preferences and limited incomes, consumers choose to buy combinations of goods that maximize their satisfaction.”); *id.* at 69 (“this model [of consumer choice that assumes consumers make choices that maximize their welfare] has been extremely successful in explaining much of what we actually observe regarding consumer choice and the characteristics of consumer demand. As a result, this model is a basic ‘workhorse’ of economics. It is used widely, not only in economics, but also in related fields such as finance and marketing.”).

<sup>640</sup> SetApp, Annual Mac Developer Survey (2019) (available at <https://cdn.setapp.com/blog/images/Annual-Setapp-Mac-Market-Survey-2019.pdf>) (survey of 812 macOS developers. It found that macOS developers earn on average 58% of their total revenue from outside the Mac App Store.).

<sup>641</sup> Reed, Albergotti, *The ‘app store’ before there was an App Store wants to liberate your iPhone ... again* (published December 10, 2020, available at <https://www.washingtonpost.com/technology/2020/12/10/cydia-apple-lawsuit/>) (“There were so many people using [Cydia] that [Freeman, the founder of Cydia] estimated half of early iPhone customers must have been ‘jailbreaking’ their phones to take advantage of the additional features it offered. In 2010, Freeman told the Washington Post that Cydia had 4.5 million people searching for apps every week. . . Cydia’s revenue peaked in 2011 and 2012, when it brought in about \$10 million, Freeman said. Cydia, like Apple, charged developers a commission on sales.”).

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to install Windows apps, they use alternatives to the Microsoft store [REDACTED] of the time.<sup>642</sup>

439. To be clear, this particular form of harm to consumers does *not* depend on the premise that Apple’s conduct inflated the prices of any apps or in-app products on the App Store. Instead, it depends only on the premise that at least some consumers would, if given the choice, have chosen to use rival iOS app distributors or direct distribution of iOS apps for at least some of their transactions.

***B. Anticompetitively Inflating Developer Commissions Also Harmed App Store Consumers***

440. By anticompetitively inflating the commission charged to developers in the iOS app distribution market, Apple’s conduct harmed iOS device users by reducing the number and quality of iOS apps and in-app content.

441. Anticompetitively inflating the developer commission reduced the number and quality of iOS apps by reducing the expected return on investment in developing an app or in-app product. Developing an app or in-app product generally requires a significant upfront investment.<sup>643</sup> Consequently, a profit-maximizing developer will invest in an additional app or in-app product only if their expected return on that investment is sufficiently high. Therefore, anything that reduces developers’ expected return on their investments (such as an increase in the commission percentage) will reduce the number of apps and in-app products that have a sufficiently high return to justify their investment costs. Apple implicitly acknowledged this fact when it asserted that developers are more likely to “develop new, innovative features” the lower Apple’s commission is.<sup>644</sup> Anticompetitively

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<sup>642</sup> MSFT EPIC 00000348 (2018 internal Microsoft presentation stating that [REDACTED])

<sup>643</sup> Kate Abrosimova, *How Much Does It Cost to Make an iOS or Android App?* (available at <https://yalantis.com/blog/iphone-ipad-android-app-development-cost/>) (“a simple iOS app with basic functionality usually takes up to two months to build and costs about \$30k. A more complex app that requires more than two months of development will cost about \$50k. A high complexity iOS or Android app with an extensive database ... for an enterprise can last for more than six months and require \$80k.”).

<sup>644</sup> Apple Newsroom, *Developers see a world of possibilities with new App Store Small Business Program* (published Nov. 18, 2020) (available at [www.apple.com/newsroom/2020/11/developers-see-a-world-of-possibilities-with-new-app-store-small-business-program/](https://www.apple.com/newsroom/2020/11/developers-see-a-world-of-possibilities-with-new-app-store-small-business-program/)) (“With the new App Store commission, small and individual

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inflating Apple’s commission therefore reduced the number and quality of apps and in-app content on the iOS app store.

442. Although Apple and its economic experts have asserted that Apple’s challenged conduct is justified by the support Apple provides developers, I have seen no evidence indicating that Apple would provide inferior support to developers if developers and consumers could use alternative iOS app distributors. In Part VI.B.2, I describe the evidence indicating that Apple would provide the same level of support to iOS app distributors even if it had to compete against rival iOS app distributors.

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developers who earn up to \$1 million in revenue for the calendar year are eligible for a reduced 15 percent commission rate — half of the App Store’s standard commission. The savings mean small businesses and developers will have even more funds to invest in their businesses, expand their workforce, and develop new, innovative features for app users around the world.”).



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## APPENDIX A: ANTICOMPETITIVE CONDUCT RELATED TO ANDROID APP DISTRIBUTION

443. The domestic Android app distribution market is only slightly more competitive than the domestic iOS app distribution market and appears to be tainted by anticompetitive conduct. The following sections explain that:

1. Google uses tying agreements with smartphone OEMs to get the Google Play store pre-installed and prominently displayed.
2. Google entered into agreements with smartphone OEMs that prohibited the pre-installation of rival Android app distributors.
3. Google made its dominant Chrome browser “warn” Android users not to download the “.apk” files that are necessary to install rival Android app distributors that were not pre-installed on their phones.
4. Android’s operating system restrains the installation of rival app distributors that were not pre-installed.
5. Rival Android app distribution has been driven out or limited.

### *1. Google Used Tying Agreements with Smartphone OEMs to Get the Play Store Pre-installed and Prominently Displayed on Most Android Devices*

444. Google uses tying agreements with Android smartphone OEMs in order to get the Play Store pre-installed and prominently displayed. The tying conditions are contained in Google’s “Mobile Application Distribution Agreements” (“MADAs”) with smartphone OEMs, such as Samsung and LG.<sup>645</sup> Although the Android operating system is open source, Google’s proprietary apps (such as Chrome, the Play Store, Google Search, Google Maps, and YouTube) and proprietary Google APIs (called “Google Play Services”) are not.<sup>646</sup> Smartphone

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<sup>645</sup> GOOG-APPL-00111785 at GOOG-APPL-00111791 (August 2019 internal Google document. The cited slide states: [REDACTED])

[REDACTED]

<sup>646</sup> Android, *Google Mobile Services* (available at <https://www.android.com/gms/>) (“Add GMS to your devices. While the Android Open Source Project (AOSP) provides common, device-level functionalities such as email and calling, GMS is not part of AOSP. GMS is only available through a license with Google and delivers a holistic set of popular apps and cloud-based services.”); *id.* (“Google Mobile Services (GMS) is a collection of Google applications and APIs”. The “APIs” text has a hyperlink to <https://developers.google.com/android/guides/overview>, which provides an “Overview of Google Play Services”); European Commission on Competition, July



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OEMs must sign MADA agreements in order to pre-install *any* of these proprietary apps or APIs on their smartphones.<sup>647</sup> Although I do not have a complete set of Google’s MADA agreements, multiple sources indicate that Google’s MADA agreements always require smartphone OEMs to pre-install and prominently display the Google Play Store.<sup>648</sup>

445. Google’s MADA agreements thus tie the Google Play Store (the tied product) to *all* of the following tying products, each of which competes in a different market:

- (a) Google Search (search engine)
- (b) Chrome (browser)
- (c) Gmail (email client)
- (d) YouTube (video streaming)
- (e) Google Maps (navigation)
- (f) Google Calendar (a calendar)
- (g) Google voice search / assistant (voice recognition)
- (h) Google Play Services API (supporting APIs).

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18, 2018 Decision in Google Android, Case AT.40099 ¶144 (“the Play Store and Google Play Services re licensed together as part of the GMS bundle, and Google does not license them separately.”)

<sup>647</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶156 (“the [Android open source license] AOSP does not grant hardware manufacturers the right to distribute Google’s proprietary apps such as Google Search, Google Chrome, the Play Store, and Google Play Services.... In order to obtain those rights, Google requires hardware manufacturers to enter into a MADA”).

<sup>648</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶184 (Google’s MADA agreements require that “hardware manufacturers must place on the device’s default home screen the icons which give access to ... the Play Store”); GOOGLE-003371669 in Oracle v Google at GOOGLE-003371673 (January 1, 2011 MADA agreement between Google and Samsung. §3.4 states that Samsung must “preload Google Applications ... on each Device; (2) Google Phone-top Search and the Android Market Client icon must be placed at least on the panel immediately adjacent to the Default Home Screen”); GOOGLE-03371632 from Oracle v Google at GOOGLE-03371634 (January 1, 2011 MADA agreement between Google and HTC. §2.1 states that HTC may distributed licensed devices only “if all Google Applications (excluding any Optional Google Applications) ... are pre-installed on the Device”); *id.* at GOOGLE-03371633 (“Google Applications” defined to include “Android Market.” “Optional Google Applications” definition does not include “Android Market.”); *id.* at GOOGLE-03371635 (“Google Phone-top Search and the Android market client must be placed at least on the panel immediately adjacent to the Default Home Screen”);

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446. The evidence indicates that Google has market power in many of the markets in which these tying products compete.<sup>649</sup>

447. *Google Search*. “Google has a monopoly in the market[] for general online search.”<sup>650</sup> Data indicates that Google has a 94% share of the U.S. mobile search engine market.<sup>651</sup>

448. *Chrome*. Chrome is the “world’s most popular browser,”<sup>652</sup> and has an 83% share of Android mobile browsing worldwide.<sup>653</sup>

449. *Google Maps*. Google Maps is the dominant navigation mapping service. Google Maps accounts for 80% “of the market for navigation mapping service.”<sup>654</sup>

450. *Google Play Services*. “Google Play Services” are a set of proprietary APIs that the majority of Android apps (including not only Google apps, but also third-party apps) rely on in order to function properly.<sup>655</sup> For example, many

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<sup>649</sup> This is not meant to be an exhaustive list of the tying products that compete in markets where Google has market power.

<sup>650</sup> House Subcommittee on Antitrust, *Investigation of Competition in Digital Markets* (2020) at 14.

<sup>651</sup> Statcounter, *Mobile Search Engine Market Share United States of America* (available at <https://gs.statcounter.com/search-engine-market-share/mobile/united-states-of-america>).

<sup>652</sup> House Subcommittee on Antitrust, *Investigation of Competition in Digital Markets* (2020) at 15 (“Through Chrome, Google now owns the world’s most popular browser”).

<sup>653</sup> Statcounter, *Mobile Browser Market Share Worldwide* (available at <https://gs.statcounter.com/browser-market-share/mobile/worldwide>) (showing mobile browser worldwide shares as of April 2020. Chrome: 63%, Safari: 24%. Safari (Apple’s browser) is not available on Android devices, so this implies that Chrome’s share of Android mobile browsers is at least 63% / (1-24%) = 83%).

<sup>654</sup> House Subcommittee on Antitrust, *Investigation of Competition in Digital Markets* (2020) at 15 (“Through Google Maps, Google now captures over 80% of the market for navigation mapping service”).

<sup>655</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶138 (“Google Play Services is a Google proprietary software layer that provides background services and APIs for apps integration with Google’s proprietary cloud services”); *id.* ¶140 (“The Google Play Services APK contains the various Google services and runs as a background service in Android. The Google Play Services library contains the interfaces to the individual Google services and allows Google’s proprietary and third party apps to obtain authorization from users to gain access to these services with their credentials.”); *id.* at ¶141 (“Almost all of Google’s proprietary apps use Google Play Services”); *id.* at ¶142 (“The Google



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Android apps rely on the Google Play Services API to: (a) get an accurate estimate of the device’s current location; (b) send messages between devices; (c) store data in the cloud; (d) securely log into users’ Google accounts; and (e) “cast” the contents of the phone to other devices (like TVs).<sup>656</sup> Consequently, “without access to these services, many apps would either crash, or lack important functions.”<sup>657</sup> Because smartphone OEMs must agree to pre-install the Google Play Store in order to also pre-install Play Services, Google essentially conditions the ability of an Android smartphone to use the majority of Android apps on the smartphone OEM agreeing to pre-install the Google Play Store.<sup>658</sup>

451. Google has entered into MADA agreements with all the major Android smartphone manufacturers.<sup>659</sup>

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Play Services Library is also integrated into a large number of third party apps that embed Google’s services in their apps for functionalities, such as push notification, location, and maps. According to AppBrain, more than 60% of the most downloaded apps in the Play store use the cloud messaging service of Google through the Google Cloud Messaging Library. 45% of all Android apps also contain the library for AdMob, Google’s mobile advertising service. Without access to these services, many apps would either crash, or lack important functions.”).

<sup>656</sup> Google Play Services, API Reference (available at <https://developers.google.com/android/reference/packages>); European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 n. 119 (“According to estimates by Yandex, approximately 65% of the most popular free android apps used at least one of the API’s of Google’s Play Services.”).

<sup>657</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶142.

<sup>658</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶621 (“Google’s economic strength in the worldwide market (excluding China) for Android app stores is reinforced by the fact that the only way for OEMs to obtain Google Play Services is to obtain the Play Store.”); *id.* ¶623 (“the Google Play Services are integrated in a large number of third party apps and without access to these libraries, many apps would either crash or not function properly”); *id.* ¶624 (“Amazon could not feasibly replicate the full functionalities provided by [Google Play Services] APIs. Amazon has invested a significant amount of money, time, and resources, yet has developed analogues for just a small number of Google Play Services APIs so that developers may use device messaging, maps, in-app purchasing, mobile advertising, analytics, and games services in their Fire OS apps” because such devices do not license Google’s GMS and therefore do not include Google Play Services).

<sup>659</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶189 (“Between March 2009 and April 2017, Google entered into MADAs with at least [200-300] ... hardware manufacturers, including major hardware manufacturers such as HTC, Huawei ..., Lenovo, ... LG, ... Samsung, ... and Sony.”); GOOG-APPL-00037534 at GOOG-APPL-00037537 (internal Google document from 2017. [REDACTED])



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452. Using tying agreements to get the Play Store pre-installed and prominently displayed on most Android devices has given the Google Play Store an artificial advantage relative to other Android app distributors. Even if (contrary to fact) Google did not engage in any other anticompetitive conduct, these tying agreements can help Google attain and maintain a dominant share of the domestic Android app distribution market. As I discuss in the following sections, Google has anticompetitively increased the Google Play Store’s advantage from being pre-installed by: (a) entering into contracts that require smartphone OEMs *not* to pre-install rival Android app distributors; and (b) using its control over the Android open source standard and the dominant Chrome browser to make installing Android apps from non-pre-installed app distributors more difficult.

*2. Google Used Anticompetitive Agreements to Restrain Smartphone OEMs from Pre-Installing Rival Android App Distributors*

453. Google anticompetitively restrained competition in the domestic Android app distribution market also by entering into agreements with OEMs that required the OEMs to exclude rival Android app distributors.<sup>660</sup> Although discovery on these agreements is limited, the available evidence indicates that [REDACTED]

[REDACTED]<sup>661</sup> The evidence indicates that Google entered into these types of agreements at least as

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<sup>660</sup> House Subcommittee on Antitrust, *Investigation of Competition in Digital Markets* (2020) at 222 (“Google’s restrictive contracts with smartphone manufacturers have strictly limited—if not excluded—third party apps from being pre-installed.”).

<sup>661</sup> GOOG-APPL-00111785 at GOOG-APPL-00111796-97 (August 2019 internal Google document stating “We have projects thinking about all of these... in all different stages. Under “approved” it says [REDACTED]”).



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early as 2011,<sup>662</sup> and at least as recently as 2020.<sup>663</sup> This evidence is consistent with the legal allegations made by Epic that Google’s agreements with the smartphone OEMs OnePlus and LG deterred those OEMs from pre-installing the Epic Game Store on their phones.<sup>664</sup>

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<sup>662</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶202 (“Google and [revenue share partner] entered into a portfolio-based revenue share agreement on 1 February 2011 for a period ending on 31 December 2012. Google agreed to share [revenue share terms] of its net ad revenues in return for [revenue share partner] committing that it “will not, and will not allow any third party to: implement” on Google Android devices “any application, product or service which is the same as or substantially similar to Android Market”, which was the previous name of the Google Play Store) (brackets in original due to redactions); *id.* ¶206 (“Google and [revenue share partner] entered into a portfolio-based revenue share agreement on 1 September 2011 until 30 November 2013. Google agreed to share [revenue share terms] of its app sales revenues made through the Play Store on [revenue share partner]’s devices, and in return for the shares of net ad revenues and app revenues, [revenue share partner] committed that “[n]o widget, pointer, bookmark or application that is substantially similar to ... Android Market may be preloaded” on any of the revenue share partner’s devices).

<sup>663</sup> GOOG-APPL-00126531 (May 2020 internal Google document titled [REDACTED] at GOOG-APPL-00126532 [REDACTED])

<sup>664</sup> Epic v. Google Complaint ¶17 (“Another OEM, LG, told Epic that its contract with Google did not allow it to enable the direct distribution of apps, and that the OEM could not offer any functionality that would install and update Epic games except through the Google Play Store.”); *id.* ¶16 (“Epic v. Google Complaint ¶ 16 (“Epic’s experience with one OEM, OnePlus, is illustrative. Epic struck a deal with OnePlus to make Epic games available on its phones through an Epic Games app. The Epic Games app would have allowed users to seamlessly install and update Epic games, including Fortnite, without obstacles imposed by Google’s Android OS. But Google forced OnePlus to renege on the deal, citing Google’s “particular[] concern” about Epic having the ability to install and update mobile games while “bypassing the Google Play Store”).

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### 3. Google’s Dominant Chrome Browser Warns Users Against Installing Rival Android Apps

454. If an Android app distributor’s app is not pre-installed on a device (if, for example, because a Google agreement prohibited it), then the device user must first install the rival app distributor’s app before it can use the rival app distributor to obtain additional apps. The information necessary to install an Android app is contained in a file with a “.apk” extension.<sup>665</sup> Google does not allow other Android app distributors in the Play Store,<sup>666</sup> so to obtain the “.apk” file of an Android app distributor that was not pre-installed, the user would first have to download the file from the rival app distributor’s website.<sup>667</sup>

455. Google’s web browser (Chrome) has at least an 83% share of Android mobile web browsing.<sup>668</sup> If an Android user tries to download an .apk on Chrome, the browser will warn them “This type of file can harm your device,” and ask the user whether they “want to keep [the .apk file] anyway?”<sup>669</sup> In contrast, the Google Play Store app does not warn users that downloading an .apk file can “harm their device,” even though installing an app from the Google Play Store also involves downloading a .apk file. Further, no such warning is shown if one downloads an .apk file on the Android version of Mozilla’s Firefox web browser. Google using its Chrome web browser to “warn” Android users not to download .apk files thus helps

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<sup>665</sup> Android, Application Fundamentals (available at <https://developer.android.com/guide/components/fundamentals>) (“One APK file contains all the contents of an Android app and is the file that Android-powered devices use to install the app.”).

<sup>666</sup> Google Play Developer Distribution Agreement (available at <https://play.google.com/about/developer-distribution-agreement.html>) § 4.5 (“You may not use Google Play to distribute or make available any Product that has a purpose that facilitates the distribution of software applications and games for use on Android devices outside of Google Play.”).

<sup>667</sup> On Windows and macOS, users typically obtain non-default app distributors, such as Steam and Epic, by downloading the installation files from their websites. <https://store.steampowered.com/about/> (website hosted by Valve with a link to the Steam installer for Windows, macOS, or Debian Linux); <https://www.epicgames.com/store/en-US/> (website hosted by Epic with a link to the Epic Game Store installer).

<sup>668</sup> Statcounter, Mobile Browser Market Share Worldwide (available at <https://gs.statcounter.com/browser-market-share/mobile/worldwide>) (showing mobile browser worldwide shares as of April 2020. Chrome: 63%, Safari: 24%. Safari (Apple’s browser) is not available on Android devices, so this implies that Chrome’s share of Android mobile browsers is at least 63% / (1-24%) = 83%).

<sup>669</sup> See, e.g. EPIC\_04040163 at EPIC\_04040169 (visually demonstrating how to sideload the Fortnite app).

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deter users from installing Android apps from rival Android app distributors whose apps are not pre-installed on smartphones.

#### 4. *Android’s OS Restrains Rival App Distributors*

456. Google acquired Android in 2005,<sup>670</sup> and Google is the main developer of the Android operating system.<sup>671</sup> Although a small minority (<4%) of smartphone OEMs use “forked” versions of Android that deviate from the version Google controls, the lion’s share (96%) use Google’s version of Android.<sup>672</sup> This gives Google the ability to restrain competition from rival Android app distributors by designing Android in a way that advantages the Google Play Store, and in several ways the design of the Android OS does restrain rival app distributors.

457. An internal Google document from 2013 notes that, “by default, only Google Play (and other pre-installed app stores) are allowed to install apps” on Android.<sup>673</sup> This contrasts with other operating systems for general purpose computing devices, like Windows and macOS, which instead by default do *not* require users to install apps using pre-installed app stores (such as the Microsoft Store or the Mac App Store).<sup>674</sup> This feature of Android OS design advantages the Google Play Store and restrains rival distributors because of Google’s agreements with smartphone OEMs that require the OEM to pre-install the Google Play Store and/or not to pre-install rival Android app distributors, as discussed above.

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<sup>670</sup> House Subcommittee on Antitrust, Investigation of Competition in Digital Markets (2020) at 212.

<sup>671</sup> Android Open Source Project (available at <https://source.android.com/>) (“Android is an open source operating system for mobile devices and a corresponding open source project led by Google.”).

<sup>672</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at Table 3 (“Worldwide (excluding China) market shares for licensable smart mobile device OS.” The footnote to the table states that “For the calculation of Google Android market shares, Android forks sales were excluded (namely sales of Fire OS – Amazon.com sales -, Flyme, Nokya X, and Yun”).

<sup>673</sup> GOOG-APPL-00020369 at GOOG-APPL-00020376.

<sup>674</sup> See Apple, *Safely open apps on your Mac* (available at <https://support.apple.com/en-us/HT202491>) (“By default, the security and privacy preferences of your Mac are set to allow apps from the App Store and identified developers. For additional security, you can chose to allow only apps from the App Store.”); The default setting in Windows is to allow the installation of apps from any source. A user can change that setting so that they can install apps only from the Microsoft Store. Microsoft, *Change your app recommendation settings in Windows 10* (<https://support.microsoft.com/en-us/windows/change-your-app-recommendation-settings-in-windows-10-f21b5c60-e996-4ee4-c2cf-b4a90c0bef9b>).



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458. Further, the evidence indicates that Google has often changed Android’s design in ways that make it less likely for users to install applications from sources other than pre-installed app distributors. For example, a rival Android app distributor, Aptoide, alleged in 2014 that “it took 10 steps to install the Aptoide app store on Android version 2.1, and 80% of [focus group] users could do it,” whereas in contrast, Android version 4.0 “required 14 steps and only 20% [of focus group users] completed the installation.”<sup>675</sup>

459. The current steps necessary to install an Android app from a source other than a pre-installed Android app distributor are as follows and clearly deter the installation of rival Android app distributors. Assuming an Android user completes the download of the .apk file (despite Google Chrome’s warning), then the Android operating system will present a message stating, “For your security, your phone is not allowed to install unknown apps from this source [the web browser],” and give the user the option to alter this setting.<sup>676</sup> If the user selects the button to alter this setting, a new screen will appear titled “Install unknown apps.” This screen warns the user that “Your phone and personal data are more vulnerable to attack by unknown apps. By installing apps from this source [the web browser], you agree that you are responsible for any damage to your phone or loss of data that may result from their use” and gives the user the option to change the “Allow from this source” setting from off to on.<sup>677</sup> If the user changes the “Allow from this source” setting to on, they can then finally install the Android application on their phone.

460. Suppose this first app that the user directly downloaded was a rival Android app distributor, like the Epic Game Store. Then the user would also need to change additional settings on their Android device in order to use the Epic Game app to install Android apps. When a user tries to install another app downloaded from the Epic Games app, Android will warn them that: “For your security, your phone is not allowed to install unknown apps from this source [the Epic Games App].” The user must then select an option to change this setting, which will lead them to a new screen titled “Install unknown apps,” where they will again see the warning that “Your phone and personal data are more vulnerable to attack by unknown apps.” If the user again disregards this warning and changes the “Allow from this source” option from off to on for the Epic Games app, then the user can

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<sup>675</sup> Mike Butcher, *Third Party Android App Store Files EU Antitrust Complaint* (published June 17, 2014, available at <https://techcrunch.com/2014/06/17/third-party-android-app-store-files-eu-antitrust-complaint/?guccounter=1>).

<sup>676</sup> See, e.g., EPIC\_04040163 at EPIC\_04040169 (visually demonstrating how to sideload the Fortnite app)

<sup>677</sup> EPIC\_04040163 at EPIC\_04040169.



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finally install additional apps from the Epic Games app (or whatever rival app distributor they wish to use).

461. Epic also alleges that Google has also designed Android to prevent the automatic updating of apps that are installed from sources besides pre-installed app distributors.<sup>678</sup> If that allegation is true, that design choice would also advantage the Google Play Store over app stores that are not pre-installed by smartphone OEMs. The Google Play Store can automatically update apps in the “background” (i.e., when the user does not have the app open) so that the app is always fully updated and immediately ready to use whenever the user opens it.<sup>679</sup> In contrast, if an app could not be automatically updated in the background, its users would have to open the app and wait for any updates to install before using it.

462. Internal Google documents show that Google recognizes that it can increase Google Play’s revenues by restraining the installation of Android applications from sources besides pre-installed app distributors. For example, a Google document from 2018 titled “Solving leakage in Android distribution” discussed implications of “turning off” “Unknown Sources” (i.e., making it impossible for users to install apps from sources besides pre-installed app distributors).<sup>680</sup> The document acknowledges that allowing installations from “unknown sources” “enable[s] app install outside [of Google] Play,” and therefore that “turning off Unknown Sources” would benefit Google by “Eliminat[ing] revenue risk” for the Google Play Store.<sup>681</sup> The same document acknowledges that “turning off Unknown Sources” would harm developers, who would “Lose alternate distrib[ution] channels.”<sup>682</sup>

### *5. Rival Android App Distribution Has Been Driven Out or Limited*

463. Not surprisingly given the above restraints, rival Android app distribution has been driven out or limited. In the U.S. market, many makers of

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<sup>678</sup> Epic v. Google Complaint ¶101.

<sup>679</sup> Google Play Help, *Update your Android apps* (available at <https://support.google.com/googleplay/answer/113412?hl=en>).

<sup>680</sup> GOOG-APPL-00113339 (October 2018 internal Google document titled “Solving leakage in Android distribution.”) at GOOG-APPL-00113372.

<sup>681</sup> *Id.*

<sup>682</sup> *Id.*

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Android devices *tried* to offer their own Android app distribution store.<sup>683</sup> However, only the Google Play Store has obtained a significant share of the domestic Android app distribution market.<sup>684</sup> For example, the Android app stores previously offered by Blackberry, LG, and Nokia have all been driven out of the market.<sup>685</sup> Further, although the Amazon App Store has survived as the only pre-installed app distributor on Amazon Fire devices, Amazon has discontinued making smartphones.<sup>686</sup> On non-Amazon devices (including all smartphones), post-purchase installation of the Amazon App Store is restrained in all the ways described above, and thus rare, limiting its market share.<sup>687</sup>

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<sup>683</sup> Schmalensee 2021-02-16 report in Epic v. Apple Exhibit 1. Examples of smartphone OEMs who opened their own Android app distribution stores include: Google, Samsung, Amazon, Blackberry, LG, and Nokia.

<sup>684</sup> See *infra* notes 690, 692.

<sup>685</sup> Jon Fingas, *Blackberry will shutter its app store on December 31, 2019* (published December 15, 2017, available at <https://www.engadget.com/2017-12-15-blackberry-app-store-closes-in-2019.html>); Manish Singh, *LG is shutting down its smartphone business worldwide* (published April 5, 2021, available at <https://techcrunch.com/2021/04/04/lg-is-shutting-down-its-smartphone-business-worldwide/>) (“Other legacy phone brand such as BlackBerry and Nokia have faced their own struggles, and neither company now exists in its original form.”); Nokia, *Successful Migration from Nokia Store to Opera Mobile Store* (available at <https://web.archive.org/web/20150222041337/http://developer.nokia.com/blogs/news/successful-migration-from-nokia-store-to-opera-mobile-store>).

<sup>686</sup> Ben Fox Rubin & Roger Cheng, *Fire Phone one year later: Why Amazon’s smartphone flamed out* (published July 24, 2015, available at <https://www.cnet.com/news/fire-phone-one-year-later-why-amazons-smartphone-flamed-out/>) (“Amazon’s Fire tablets have run off a heavily customized version of the Android operating system software, which meant they didn’t have access to key Google apps like Maps or Gmail. So when it came time to make a Fire Phone, Amazon pursued the same strategy. Turns out, people like those Google apps”); Mark DeCambre, *Amazon says it has ended sales of Fire Phone* (published September 9, 2015, available at <https://www.marketwatch.com/story/amazon-says-it-has-ended-sales-of-fire-phone-2015-09-09>).

<sup>687</sup> European Commission on Competition, July 18, 2018 Decision in Google Android, Case AT.40099 at ¶636(3) (“According to Amazon: ‘Currently, consumers rarely download an app store onto their mobile device when another app store was pre-installed. Downloadable app stores struggle to gain traction because the pre-installed app store has the inbuilt advantage of being front and centre of the end user’s experience when they first get their device.’”). Amazon stopped selling smartphones in 2015, so the Amazon App Store is not pre-installed on any smartphones anymore. Mark DeCambre, *Amazon says it has ended sales of Fire Phone* (published September 9, 2015, available at <https://www.marketwatch.com/story/amazon-says-it-has-ended-sales-of-fire-phone-2015-09-09>).

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464. As a result, Google’s “Play Store” (originally named “Android Market”<sup>688</sup>) is the dominant Android app distributor.<sup>689</sup> As of 2016, Google has between a 90% and 100% share of Android app downloads outside of China, with no other Android app distributor having more than a 5% share.<sup>690</sup> The Android app distribution market is thus extremely concentrated; its HHI is at least 8,100 (out of a maximum of 10,000), and the Merger Guidelines consider any market with a HHI more than 2,500 as “highly concentrated.”<sup>691</sup> Further, an internal Google document from 2019 [REDACTED],<sup>692</sup> which constitute 60% of Android phones in the U.S and come pre-installed with two Android app distributors: the Google Play Store and the Samsung Galaxy Store.<sup>693</sup>

<sup>688</sup> Chris Velazco, *Goodbye Android Market, Hello Google Play* (published March 6, 2012, available at <https://techcrunch.com/2012/03/06/goodbye-android-market-hello-google-play/>).

<sup>689</sup> House Subcommittee on Antitrust, *Investigation of Competition in Digital Markets* (2020) at 95 (“The Google Play Store is the dominant app store on Android devices.”).

<sup>690</sup> July 18, 2018 European Commission Decision in Case AT.40099 (Google Android), at Table 5. The commission decision redacted the Google Play Store’s exact share, instead reporting Google’s share as “90-100%”.

<sup>691</sup> DOJ/FTC Horizontal Merger Guidelines §5.3. The Herfindahl-Hirshman Index of a market equals the sum of the squares of the individual firms’ market shares, and therefore is higher in more concentrated markets. If Google’s market share is at least 90%, then the HHI is at least  $90^2 = 8,100$ .

<sup>692</sup> GOOG-APPL-00112321 at GOOG-APPL-00112325 (August 2019 internal Google document indicating [REDACTED])

<sup>693</sup> Statcounter, *Mobile Vendor Market Share United States of America* (available at <https://gs.statcounter.com/vendor-market-share/mobile/united-states-of-america>, last accessed May 2, 2021) (for April 2021, the market shares are: Apple: 59.13%, Samsung: 24.47%, Google: 2.33%). This implies that Samsung’s share of non-iOS (i.e., non-Apple) mobile device sales is  $24.47\% / (100\% - 59.13\%) = 60\%$ . Samsung Galaxy phones come with the Google Play Store and Samsung Galaxy Store pre-installed. T-mobile, *Pre-installed apps: Samsung Galaxy S8* (available at <https://www.t-mobile.com/support/devices/android/samsung-galaxy-s8/pre-installed-apps-samsung-galaxy-s8>).



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Books

ELHAUGE, U.S. ANTITRUST LAW & ECONOMICS (3d ed. 2018) (Foundation Press: 2d ed. 2011; 1<sup>st</sup> ed. 2008).

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“Economists Argue Over the Cost of Caring for the Uninsured,” The Daily Beast (March 26, 2012)

“The Broccoli Test,” New York Times (Nov. 16, 2011)

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"Rewire This Circuit," The Wall Street Journal, A26 (Sept. 17, 2003)

"Soft on Microsoft," The Weekly Standard (March 25, 2002)

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"Foul Smoke," The Washington Post, A15 (August 4, 1998)

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"Term Limits: Voters Aren't Schizophrenic," Wall Street Journal, A-16 (March 14, 1995)

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Harvard Committees

Chair, Harvard Law School Lateral Appointments Committee (1998-99), Member (2003-05, 2011-2014).

Member, Harvard Law School Entry Level Appointments Committee (2009-2011).

Member, Harvard University Standing Committee on the Degree of Doctor of Philosophy in Health Policy (1996-99, 2006-07).

Member, Harvard University Internal Advisory Board for the Interfaculty Initiative in Health Policy (1996-99).

Member, Harvard Law School Lecturers and Visitors Committee (1996-98).

**Past Academic Positions**

1988-95	Professor of Law, Boalt Hall, University of California at Berkeley
1995	Visiting Professor of Law, Univ. of Chicago Law School
1994	Visiting Professor of Law, Harvard Law School
1993	Visiting Olin Faculty Fellow, Yale Law School
1991-92	Visiting Scholar in Europe at the Karolinska Institute, the Centre for Health Economics, the Rockefeller Foundation Study Center, Cambridge University, the European University Institute and the University of Florence

**Clerkships**

1987-88	Clerk for Justice William J. Brennan, Jr., United States Supreme Court
1986-87	Clerk for Judge William A. Norris, U.S. Court of Appeals for the Ninth Circuit
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**Bar Admissions:** Massachusetts (2000); Pennsylvania (1986); United States Courts of Appeals

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**ECONOMICS EXPERT WORK**

President, Legal Economics LLC, 2007 to present.

Senior Expert at Criterion Economics LLC, 2004-2007

Recipient in 2016 and 2020 of AAI award for Outstanding Antitrust Litigation Achievement in Economics.

Named One of World's Leading Competition Economists in the *International Who's Who of Competition Lawyers and Economists*.

Testifying Expert in *In Re Novartis And Par Antitrust Litigation*, a case alleging an reverse payment patent settlement delayed generic competition with the branded pharmaceutical Exforge.

Testifying Expert in *In Re EpiPen Marketing Sales Practices and Antitrust Litigation*, a case alleging anticompetitive reverse payments and foreclosing agreements.

Testifying Expert in *Roxul USA, Inc. v. Armstrong World Industries, Inc.*, a case alleging exclusive dealing agreements in the market for suspended acoustical ceiling tiles.

Testifying Expert in *Sitts v. Dairy Farmers of America, Inc.*, a case alleging a conspiracy to suppress raw milk prices.

Testifying Expert in *In Re Qualcomm Antitrust Litigation*, a case alleging tying and exclusive dealing involving modem chipsets and cellular standard essential patents.

Testifying Expert in *In Re Niaspan Antitrust Litigation*, a case alleging a reverse payment patent settlement.

Testifying Expert in *In Re Lamictal Direct Purchaser Antitrust Litigation*, a case alleging a reverse payment patent settlement.



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Testifying Expert in *In re Namenda Antitrust Litigation*, a case alleging a reverse payment patent settlement and product hop.

Testifying Expert in *In re Lidoderm Antitrust Litigation*, a case alleging a reverse payment patent settlement.

Testifying Expert in *Valassis Communications v. News Corp*, a case alleging anticompetitive bundling and other exclusionary conduct.

Testifying Expert in *GN Netcom v. Plantronics*, a case alleging exclusive dealing in the distribution of contact center and office headsets.

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Testifying Expert in *Garber v. Office of the Commissioner of Baseball*, a case alleging horizontal territorial restraints on broadcasting baseball games.

Testifying Expert in *Suture Express v. Cardinal Health*, a case alleging tying and bundled loyalty contracts in medical distribution.

Testifying Expert in *Savant v. Crestron*, a case alleging exclusive dealing in the high-end home control system market

Testifying Expert in *Castro et. al. vs Sanofi Pasteur*, a case alleging anticompetitive bundled loyalty contracts in the vaccines industry.

Testifying Expert in *In re Mushroom Direct Purchaser Antitrust Litigation*, a case alleging price-fixing in the fresh mushroom market.

Testifying Expert in *It’s My Party, Inc. v. Live Nation, Inc.*, a case alleging anticompetitive conduct in markets for promotion and amphitheaters.

Testifying Expert in *Retractable Technologies v. Becton Dickinson*, a case alleging exclusionary contracts in syringe and IV catheter markets.

Testifying Expert in *Caldon v. Westinghouse Electric*, a case alleging attempted monopolization.

HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

Testifying Expert in *King Drug v. Cephalon*, a case alleging that a reverse payment settlement of a patent dispute delayed entry and restrained competition in a pharmaceutical market.

Testifying Expert for the United States in *United States v. Wyeth*, a case involving claims of bundled sales and bundled discounts in a pharmaceutical market, which resulted in a \$784 million settlement for the United States.

Testifying Expert in *BAE Holdings AH v. ArmorWorks Enterprises*, a case alleging price discrimination by a ceramic tile manufacturer resulting in harm to downstream competition.

Testifying Expert in *In re Marsh & McLennan Companies, Inc. Securities Litigation*, a case alleging securities violations from failure to disclose bid steering.

Testifying Expert in *Tessera Technologies v. Hynix Semiconductor*, a case alleging conspiracy to exclude outside technologies from semiconductor markets.

Testifying Expert in *American Steel Erectors v. Local Union No. 7*, a case alleging boycott claims related to steel erection and labor markets.

Testifying Expert in *BP America v. Repsol*, an arbitration.

Testifying Expert in *Food Lion v. Dean Foods Company*, a class action alleging conspiracies to restrict and foreclose competition in milk markets.

Testifying Expert in *Eisai Inc. v. Sanofi-Aventis U.S. LLC*, a case by a rival alleging foreclosure in anticoagulant pharmaceutical markets.

Testifying Expert in *Daniels v. Tyco*, a case by a rival alleging foreclosure from sharps containers and GPO markets.

Testifying Expert in *Natchitoches Parish Hospital v. Tyco*, a class action concerning medical sharps containers and GPO markets.

Testifying Expert in *Amgen v. F. Hoffman La Roche*, concerning erythropoietin-simulating agents (ESAs) and white blood cell simulators (WBCs) pharmaceutical markets.

Testifying Expert in *White v. NCAA*, concerning markets for athletic and educational services.

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Testifying Expert in *Applied Medical Resources v. Ethicon, Inc.*, concerning sutures, trocars, and GPO markets.

Testifying Expert in *Masimo Corp. v. Tyco Health Care Group*, concerning oximetry products and GPO markets.

Testifying Expert in *Rochester Medical v. Bard*, concerning catheter and GPO markets.

Testifying Expert in *Retractable Technologies, Inc. v. Becton Dickinson*, concerning syringes and GPO markets.

Testifying Expert in *Spartanburg v. Hill-Rom*, a class action concerning hospital beds and GPO markets.

Testifying Expert in *Mountain Area Realty v. Wintergreen Partners*, concerning conduct in the real estate brokerage services market.

Testifying Expert in *Louisiana Municipal Police Employees' Retirement System v. Crawford*, concerning merger in the pharmacy benefit manager market.

Testifying Expert in *Capital Credit Alliance v. National Automated Clearing House Association*, concerning electronic checks market.

Testifying Expert for Intel before EC and Korean antitrust authorities on microprocessor markets.

Testifying Expert for AmBev before the EC and Brazilian antitrust authorities on beer market.

Testifying Expert for 1-800-Contacts before the FTC on OSI-CooperVision merger and agreements restraining distribution by nonprescribing retailers.

Testifying Expert in *In Re Cardizem CD Antitrust Litigation*, concerning patents and pharmaceuticals.

Testifying Expert regarding the *B.F. Goodrich-Coltec* Merger, concerning the aerospace industry.

Testifying Expert regarding the *Alcoa-Reynolds* Merger, concerning the aluminum industry

Expert Consultant to National Cable Television Association on Internet Access Bills before Congress and Interactive Television Inquiry before FCC.

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Expert for Royal Caribbean for proposed mergers of Princess with Royal Caribbean and Carnival, concerning the cruise industry.

Expert for the Medical Device Manufacturers Association, producing Report to U.S. Senate and Statement to FTC/DOJ regarding exclusionary agreements between medical device suppliers and Group Purchasing Organizations and their hospitals.

**EDUCATION**

**Harvard Law School** J.D., June 1986

*Awards*

Fay Diploma -- for graduating first in class

Sears Prize -- Second Year -- to top two students in class

Sears Prize -- First Year -- to top two students in class

*Activities*

Harvard Law Review, Articles Office Co-Chair

Class Marshal

Author: *Modes of Analysis: The Theories and Justifications of Privileged Communications*,  
98 HARV. L. REV. 1471-1500 (1985).

**Harvard College** B.A., June 1982

Graduated in three years, majoring in Biochemical Sciences. GPA 3.9

**PERSONAL**

Born of Argentinian immigrants in New York City. First language was Spanish. Live with wife and 3 children in Newton, Massachusetts.



HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

## **EXHIBIT B**

### **STATEMENT OF PUBLICATIONS, PRIOR TRIAL AND DEPOSITION EXPERT TESTIMONY, AND COMPENSATION**

#### **I. Publications**

My publications from the last 10 years are listed on my CV, which is attached as Exhibit A.

#### **II. Trial and Deposition Expert Testimony**

Within the past four years, I have provided deposition testimony as an expert in *Louisiana Wholesale Drug v. Unimed Pharmaceuticals (Androgel case)* on August 10, 2017; *In re Lidoderm Antitrust Litigation* on June 6, 2017; *In re Namenda Antitrust Litigation* on September 29, 2017 and November 10, 2017; and *In re Lamictal Direct Purchaser Antitrust Litigation* on June 7, 2018; *In Re Qualcomm Antitrust Litigation* on August 1, 2018 and December 19, 2018; and *Sitts v. Dairy Farmers of America, Inc.* on November 6, 2018; *Roxul USA, Inc. v. Armstrong World Industries, Inc.* on January 14, 2019; *In re Niaspan Antitrust Litigation* on January 31, 2019; *In Re EpiPen (Epinephrine Injection, USP) Marketing Sales Practices and Antitrust Litigation* on February 6, 2019 and December 15, 2019.

Within the past four years, I have also testified as an expert at trial in *GN Netcom v. Plantronics* on October 13 and 17, 2017, at a Daubert Hearing in *Roxul USA, Inc. v. Armstrong World Industries, Inc.* on March 5, 2019, and at a class certification hearing in *In Re EpiPen (Epinephrine Injection, USP) Marketing Sales Practices and Antitrust Litigation* on June 11, 2019.

#### **III. Compensation**

I am being compensated at a rate of \$1250 per hour for my work on this case, and my consulting firm, Legal Economics LLC, is being compensated \$195-645 per hour for the work of my staff on this report.